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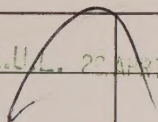
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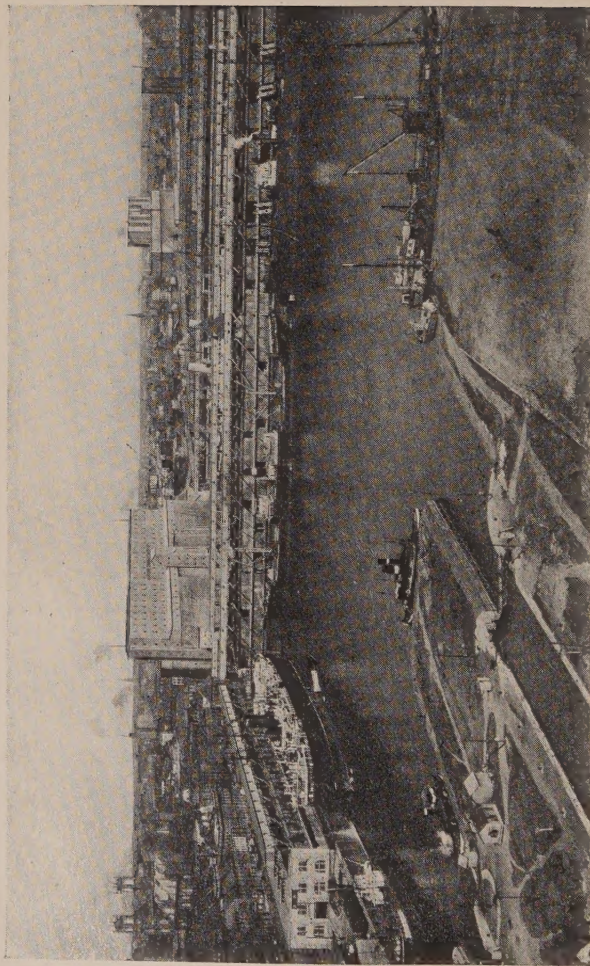
CANADA

NATURAL RESOURCES
AND COMMERCE



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MONTREAL, CANADA—AMERICA'S PREMIER GRAIN SEAPORT

CANADA

Natural Resources and Commerce



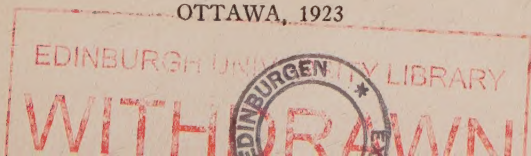
Department of the Interior
Canada

Hon. Charles Stewart,
Minister.

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Natural Resources Intelligence Service
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OTTAWA, 1923



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Foreword

The Dominion of Canada is relatively a newcomer to the field of foreign commerce on an extensive scale. Her natural resources are still largely undeveloped, and by no means thoroughly known or appreciated even by Canadians. But the rapid exploitation of the past twenty years has clearly and strikingly revealed the national domain to be such—both in character and in extent—that its full utilization must inevitably spell for Canada a wide career in international trade, rather than an unique degree of self-sufficiency.

With full appreciation of this all-important fact, the present volume, purposely very general and restricted in scope, has been prepared especially to afford those associated with international trade a concise review of the natural resources of Canada, and of the broad features which they impart to the commerce of the Dominion by their limitations as well as by their diversity and abundance.

CHAPTER I

The Newer Commercial Canada

FEW countries free from political upheaval have undergone such radical economic changes as the Dominion of Canada has experienced in the last twenty years. The span of two decades—ordinarily but an overnight in the life of a nation—has witnessed the virtual re-casting of Canada's industrial and commercial character, and the emergence of the Dominion from comparative obscurity to a position of modest but real consequence in the field of international trade.

This sudden transition has not been due in any sense to premature and concentrated growth of unstable nature. It has been a natural consequence of the fact that, for many decades, several of the chief resources of Canada were almost entirely overlooked by industry, and, when they finally engaged attention, were brought under exploitation at an unusually rapid rate owing to their thorough ripeness for development.

The delayed exploitation of the vast areas of wheat lands in Western Canada and of pulpwood lands in Eastern Canada has been mainly responsible for the fact that the Dominion as a whole is really much younger commercially than politically. More than fifty years ago Canada had achieved substantially her present territorial extent and form of government, but another generation passed before the true measure of her physical assets was revealed to industry and commerce. The dawn of the twentieth century found the Dominion on the threshold of great material progress, but still a distinctly minor contributor to the streams of international trade.

AN ERA OF RAPID GROWTH

The new century brought an abrupt departure from the steady but moderate pace of national development. The ensuing years saw millions of acres placed under cultivation in the prairies of Western Canada. Later, in the East, they witnessed the remarkably rapid expansion of the pulp and paper industry which converted an immense area of pulpwood forests into a leading commercial asset. These were merely two outstanding features of a period of widely distributed advance in Canadian industry.

The profound effect of this period upon the commercial status of the Dominion is clearly evidenced by the course of external trade. Between 1900 and 1923* the aggregate annual trade represented by exports of Canadian merchandise and imports for domestic consumption rose from \$342,000,000 to \$1,734,000,000, an increase of 407 per cent. While the value statistics require a generous discount to offset the effect of the general rise in prices since the opening of the century, it is obvious, nevertheless, that the actual volume of Canada's foreign purchases and sales has shown exceptional growth. Closer analysis shows also that the newer commercial Canada differs widely in character as well as in dimensions from the Dominion as it was known to international trade two decades ago.

CANADA'S ENLARGED ECONOMIC STRUCTURE

The commerce of Canada today flows from greatly enlarged sources. The increase of population has not been extraordinarily rapid, but there has been a very marked broadening of the industrial basis through the extension of agriculture and other primary development. Pronounced advance has likewise been made in the work of building upward as well as outward. Manufacturing

*Year ending March, 1923.

enterprise has given the Dominion in more recent years a wide range of secondary, in addition to basic industry. The advance of manufacturing has been such that within the last generation the proportion of Canadian exports, shipped in manufactured form, has risen from less than six to more than forty per cent.

The following statements of the national wealth and of the values of annual production suggest the measure and the diversity of the main sources from which the commerce of the Dominion now springs. They afford also a rough idea of the relative importance of the physical assets which the Canadian people employ in their present industrial and commercial pursuits. While it is impossible to enumerate absolute values in regard to national wealth, the table prepared by the Dominion Statistician and read in the House of Commons in June, 1922, sheds valuable light upon the nature and magnitude of the resources and equipment utilized, or available for use, by productive enterprise:

TABLE I.—WEALTH OF CANADA, 1921

Farm values, 1921—

Land.....	\$ 3,196,876,000
Buildings.....	1,035,712,000
Implements.....	391,660,000
Live stock.....	766,720,000
Poultry.....	38,007,000
Animals on fur farms.....	5,824,000

TABLE I.—WEALTH OF CANADA, 1921—*Concluded*

Mines and forests.....	1,200,000,000
Fisheries.....	50,405,000
Steam and electric railways.....	2,687,000,000
Canals.....	137,000,000
Shipping.....	200,000,000
Telegraphs and telephones.....	191,000,000
Urban real property.....\$	4,115,050,000
Manufacturing machinery.....	666,835,335
Stocks of raw materials and manufactured goods.....	789,513,000
Stored products of farm, fisheries and the mine.....	500,000,000
Household furnishings, clothing, carriages, motors, etc.....	800,000,000
Specie.....	193,603,304
Imported merchandise in store.....	250,000,000
	<hr/>
	\$ 17,215,205,639

The further figures published by the Dominion Bureau of Statistics with reference to yearly production are perhaps more useful in giving a partial view of the developed commercial value of Canada's various natural resources.

TABLE II.—CANADIAN PRODUCTION

Agriculture, 1922—	
Field crops.....	\$ 962,526,000
Farm animals.....	77,548,000
Wool.....	3,180,000
Dairy products.....	250,618,000
Fruit and vegetables.....	55,855,000
Poultry and eggs.....	58,815,000
Fur farming.....	1,504,000
Maple products.....	5,576,000
Tobacco.....	4,548,000
	<hr/>
Total, agriculture.....	\$1,420,170,000

TABLE II.—CANADIAN PRODUCTION—*Concluded*

Fisheries, 1922 (preliminary)	\$ 41,900,000
Minerals, 1922 (preliminary)	183,029,595
Furs, season of 1921-22.....	17,438,867
Forest products, 1920 (estimated).....	312,683,509

The foregoing statement does not purport to cover the entire field of production, nor all of the items directly or closely related to primary industry. Water-power production, classed in certain phases as a basic, and in others as a manufacturing industry, is valued by the Dominion Water Power Branch at more than \$83,000,000 per annum for present installations. A complete estimate of the monetary sum of Canadian production would likewise include the net value of manufacturing, amounting to \$1,830,000,000 in 1920, the earnings of railways and other large items.

INFLUENCE OF AGRICULTURAL PROGRESS

An outstanding feature of the foregoing table is the preponderance of agricultural output among the items of primary production. Forest industries, mining and other basic industries have attained a high degree of development but agriculture is unrivalled in the field of primary activity. It has been due chiefly to her resources in arable lands that Canada has advanced so far beyond her commercial status of twenty years ago.

Within the past two decades Canada has become known as one of the great granaries of the world. In the words of an American observer, the vast and fertile prairies of Western Canada experienced in the earlier years of the present century "the greatest rush for farm lands in the world's history." The period from 1902 to 1922 saw the area sown to wheat in Canada increase from less than 5,000,000 acres to more than 22,400,000 acres. The wheat crop rose from 55,000,000 to 400,000,000 bushels, and the exports from 10,000,000 bushels to 215,000,000 bushels.

The opening up of Western Canada has been incomparably the greatest single factor in the re-casting of Canada's industrial and commercial life. A major portion of the change in the complexion and stature of Canadian trade abroad and in the entire field of domestic industry is traceable, directly or indirectly, to the agricultural expansion of the prairie provinces of Manitoba, Saskatchewan and Alberta.

The growth of the past twenty years has by no means exhausted the possibilities. It serves rather to indicate the degree to which agriculture may be expected to influence the course of Canada's future development. It is true that great expanses within the Dominion can never be put under cultivation, but there is estimated to be the immense

area of some 300,000,000 acres suitable physically for agriculture and grazing. Only about one-fifth of this area has been placed under field crops.

The relation between the total area of Canada and its agricultural possibilities is indicated by the accompanying diagram. The larger figure represents the extent of cultivable land in all Canada, and the smaller figure the area already

Area under field crops • 1921 • 60,000,000 ac.	Estimated total area physically suitable for agriculture, 300,000,000 acres.
--	---

under field crops. The area sown in grain in 1921 was 47,000,000 acres, or less than one-sixth of the total cultivable lands. The yield of various cereals aggregated 862,000,000 bushels in that year and well over 1,000,000,000 bushels in 1922. While no highly speculative forecasts of the agricultural future of Canada can or need be offered, the productivity of the cultivated and the extent of the uncultivated lands leave no shadow of doubt respecting the physical ability of the Dominion to support for many years a steady and substantial widening of agricultural development.

The following table is strictly limited in the scope of deduction it permits, since the size and increase of a nation's population is today only loosely related to the volume of domestic food

production, but the comparison suggests the relative standing of the Dominion as a potential contributor to the world's food supply:—

TABLE III.—AREAS AND POPULATIONS OF COUNTRIES

	Total area, square miles	Population	Per square mile
Argentine Republic.....	1,153,119	8,533,332	7.4
Australia.....	2,974,581	5,436,794	1.8
Belgium.....	11,373	7,577,027	666.2
Brazil.....	3,275,510	30,645,296	9.3
Bulgaria.....	42,000	5,000,000	119.0
China.....	3,913,560	325,000,000	83.0
Czecho-Slovakia.....	54,438	13,636,390	250.5
Denmark.....	16,566	3,268,807	197.3
France.....	212,659	41,475,523	195.0
Germany.....	183,381	60,900,197	332.0
Italy.....	110,632	36,099,657	326.3
Japan.....	260,738	55,961,140	214.6
Netherlands.....	12,582	6,831,231	542.0
Spain.....	194,783	20,783,844	106.6
Sweden.....	173,035	5,847,037	33.8
United Kingdom.....	121,633	46,943,996	385.9
United States (exclusive of Alaska).....	3,026,789	105,683,108	34.9
Canada (total area).....	3,729,665	8,788,483	2.4
Canada (cultivable land only).....	468,750	.....	.....

(Statistics from *Statesman's Year Book*, 1921).

It is a noteworthy fact that in regard to wheat—the capital item of world trade in breadstuffs—Canada has already attained a production per head of population, and, in the past year, a total volume of export surpassing that of any other country.

PHYSICAL BASIS OF CANADIAN INDUSTRY

Although agriculture has exercised such an exceptional influence upon both the degree and the direction of Canada's more recent material progress, an appreciation of the importance of her

arable areas alone conveys a very inadequate conception of the broad and diversified basis upon which rests Canadian commerce and industry in general. The Dominion is naturally divided into five distinct regions, strikingly varied in their physical features and in the character of development which they support. In addition to farm lands they possess very extensive forest and mineral resources, fisheries and water-powers. By virtue of these assets Canadian industry has proceeded far beyond the domain of agriculture.

ATLANTIC COAST REGION

In the far east bordering the Atlantic coast is the Acadian low land, constituting the maritime provinces of Nova Scotia, New Brunswick and Prince Edward Island, and a part of the province of Quebec. This is a varied region possessing important stands of both pulpwood and saw timber, large areas suitable for mixed farming and fruit growing, abundant deposits of coal, very extensive off-shore fishing grounds and harbours of exceptional commercial importance. It is separated from the St. Lawrence valley by a spur of the Appalachian Mountain system.

The great ocean currents in the Atlantic, the cold Arctic or Labrador stream flowing south, and the warm Gulf stream flowing north along

the Atlantic coast, meet off the shores of Nova Scotia and act as a thermal influence upon the climate.

The Atlantic ports of Nova Scotia and New Brunswick do not freeze in winter, although the St. Lawrence is closed to navigation. This fact, added to the variety of their resources and their favourable situation for transatlantic, West Indian and coastal trade, gives the Maritime Provinces great natural commercial advantages.

EASTERN PLAINS REGION

The St. Lawrence valley, leading westward to the Great Lakes, forms the second natural division and embraces considerable areas in the provinces of Quebec and Ontario, bounded on the north by the Laurentian highlands and on the south by the United States. The chief manufacturing cities and more than half of the total population of Canada are located in this division. It is a region of rich farming lands and immense water-powers, as well as of forests, minerals, and fresh-water fisheries. The land is adapted to mixed farming, and the peninsula of southwestern Ontario is celebrated as a fruit-growing region. The commercial development of this division owes much to the unique inland waterway formed by the Great Lakes-St. Lawrence river system.

The presence of large inland bodies of water materially affects the climate, making the region more equable, less subject to extreme and rapid changes of temperature, milder in winter and cooler in summer, than the prevailing conditions in Northern Ontario and Manitoba. The peninsula of Ontario, extending southwesterly between lakes Ontario, Erie and Huron, enjoys a climate as mild as New York city and much more equable. This region is often called the garden of Canada, in which one may see large peach orchards and extensive vineyards.

LAURENTIAN REGION

The Laurentian plateau, following the general outline of Hudson bay and extending from the Labrador coast to the shores of lake Superior and thence northwesterly to the Arctic circle, constitutes the third natural division. This vast plateau—an expanse of some 2,000,000 square miles of rugged country—contains great mineral wealth, and from its heights flow numerous rivers providing valuable sources of water-power. In the southern portions a well-wooded belt extends from the Atlantic to the far “northwest.” The proportion of land suitable for agriculture is very limited. Thrusting a huge wedge between the

long-settled plains of Eastern Canada and the newly-colonized prairies of the West, this region has exerted a profound influence upon the course of Canadian development.

The Laurentian highland throughout its length, including the steppes of the western plains, is characterized by extremes of temperature, cold in winter and hot in summer, with rapid changes. On the North Saskatchewan river the average temperature for July, 70° Fahr., also exists at Montreal, in the Biscayan provinces of Spain and throughout the plains of Lombardy in Italy. The winter temperatures are the same as those of Stockholm.

WESTERN PLAINS REGION

Beyond the western limit of the plateau, extending from the region of the great inland lake Winnipeg westerly to the Rocky mountains, a distance of 750 miles, and reaching from the international boundary northward to the Arctic ocean, for over 1,000 miles, are the great western plains, forming the fourth natural division. These plains constitute the largest expanse of land suitable for agriculture in the Dominion. Here are the prairie wheat fields, one of the world's granaries still largely in reserve.

It is estimated that there are about 170,000,000 acres of arable land in the Prairie Provinces. Of this area only 38,500,000 acres were under field crops in 1921. The colonization of the southern portions of this region, largely within the last twenty years, has been the most spectacular phase of Canada's economic history. The southwestern areas of the Plains Region contain immense coal fields while the promise of oil has led to a thorough search now being conducted both in the south and in the great Mackenzie basin to the north.

PACIFIC COAST, OR CORDILLERAN MOUNTAIN, REGION

The fifth natural division of Canada comprises the province of British Columbia and a strip of western Alberta. It is a sea of mountains, extending westward to the Pacific ocean, and includes the islands of Vancouver, Queen Charlotte, etc. The river valleys contain rich alluvial soil, and the mildness of the climate fosters the production of fruit and semi-tropical vegetation. In some sections, where the lofty mountains intercept the Pacific rainfall from the west, irrigation is productive of excellent crops. The heavy forests which have grown in this mild climate under protection of the mountains are widely renowned. This region contains great mineral wealth, including coal, copper, silver, gold, lead and zinc, extensive water-power as yet largely

undeveloped, and highly productive fisheries. This is the most beautiful part of all Canada, the grandeur of its mountain scenery attracting travellers from all parts of the world.

The Japan current, flowing eastward across the Pacific to the shores of British Columbia, accompanied by warm moisture-laden westerly winds, exercises a moderating influence upon the climate of the coast, which is similar to that of western Europe. On the westerly sides of the mountain ranges there is copious rainfall; in the lee of the mountains it is dry, and here, in places, there is an extension of the continental dry belt which begins in Mexico and follows the mountains northward. In British Columbia the formation of the ranges produces a series of moist and dry belts. The climate of the northern interior of the province is continental in character and, excepting on the coast, it is cold in winter and warm in summer. The climate of the southern part of Vancouver Island is temperate, and at Esquimalt the mercury rarely goes below 21° in winter or higher than 79° Fahr. in summer.

The economic effect on vegetation is the crucial test of a country's climate, and of the Canadian climate it may be said that, owing to the wide extent of land, favourable conditions exist for the cultivation of all vegetable products,

fruits and cereals, that can be grown within the limits of a warm to cool temperate region.

The "newer commercial Canada" is a fact—not merely a description. The newness, as well as the character and extent, of its present industry and commerce traces back in large measure to the broad physiographic features outlined in the preceding paragraphs.

The relative slowness of the earlier economic progress of the Dominion was due to no single factor, but one of the most powerful influences in retarding advance was the manner in which the older provinces of Eastern Canada are separated from the West by the region known as the Laurentian plateau—a region of undoubted mineral and forest wealth but not continuously capable of sustaining a farming population. Even after this area had been traversed by railway it was long before the land-seeker realized that far to the westward lay an agricultural empire of amazing fertility and extent.

The other four natural divisions exhibit such wealth and diversity of natural resources that the quick industrial and commercial expansion of the Dominion, after exploitation finally reached Western Canada, followed as an entirely natural and inevitable outcome.

CHAPTER II

Canada in International Trade

THE history of Canada in international trade records very pronounced extremes of gradual and of rapid growth. Several centuries have elapsed since the earlier explorers, homeward bound with rich cargoes of furs, sailed down the St. Lawrence and out across the Atlantic. But the new land, from which they returned bearing its first contribution to the mercantile world, was still destined to remain noted through a long succession of decades chiefly as the habitat of the beaver and the domain of the fur-trader.

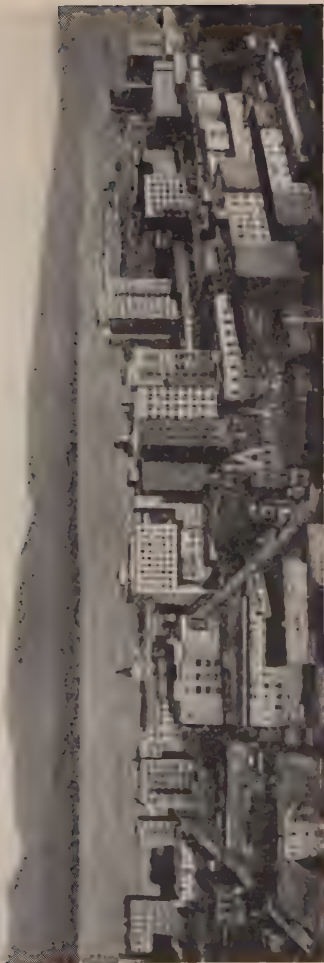
As already mentioned, the opening of the present century found Canada on the threshold of great advances but, as yet, a distinctly minor contributor to the streams of international trade. Then came the period of exceptional growth in industry and commerce. The year 1921 found the Dominion preëminent among trading countries in respect to the value of external

trade transacted per head of population and supporting a total volume of commerce in excess of that of many nations vastly superior in population. Whether or not her relative standing is maintained in that respect, Canada must henceforth be regarded as belonging to the group of countries widely engaged in and heavily dependent upon international trade.

COMMERCIAL GROWTH SPRINGS FROM BASIC DEVELOPMENT

Canada's abrupt rise to extensive participation in trade abroad is due in very small degree to purely trading enterprise and ambition. The Dominion has rather been precipitated into external commerce on a large scale by the extent and character of her natural resources and as the inevitable accompaniment of their increased exploitation.

In this regard Canada presents a notable contrast with the mother country and other nations that have long been conspicuous in world trade. The commercial strength of Great Britain—a classic example of trading nation—springs in moderate measure from the natural resources of the British Isles but also flows generously from a highly developed trading system which assembles,



VANCOUVER—CANADA'S CHIEF PACIFIC PORT

finishes and distributes natural products from every quarter of the globe. This cycle of import, manufacture and re-export, through which passes a large proportion of the commerce of Britain and other trading countries, is a relatively minor phase of Canada's external trade. Her purchases abroad are mainly for domestic consumption rather than for manufacture and re-sale. Her export sales consist chiefly of the surplus commodities drawn originally from her own natural resources. Canadian trade depends primarily and essentially upon basic development within the Dominion—upon the exploitation of arable lands, forests, fisheries, mines, water-powers and other physical assets.

MEASURE OF COMMERCIAL GROWTH

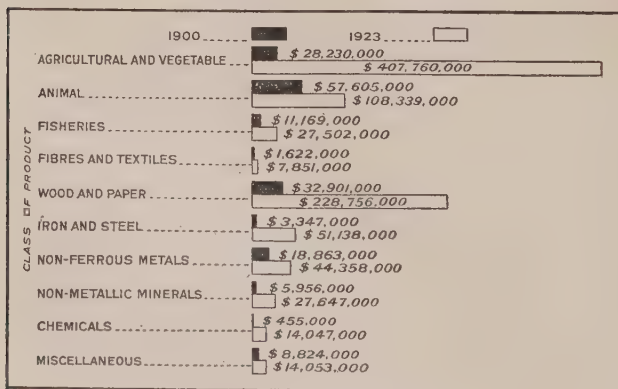
As Canada's foreign commerce is so intimately associated with basic development, a comparison of the value of export trade in 1900 with that of the year ending March, 1923, furnishes a very enlightening reflection of both industrial and commercial expansion during the present century. Such a comparison affords a useful measure of trade growth and, in addition, indicates the lines along which such growth has been most pronounced.

TABLE IV.—EXPORTS OF CANADIAN PRODUCE,
FISCAL YEARS, 1900-1923

Class of product	Value of exports, 1900	Value of exports, 1923*	Increase between 1900 and 1923	Per cent of total increase contributed by each class
Agricultural and vegetable.....	\$ 28,230,000	\$ 407,760,000	\$ 379,530,000	49·7
Animal.....	57,605,000	108,339,000	50,734,000	6·7
Fisheries.....	11,169,000	27,502,000	16,333,000	2·1
Fibres and textiles....	1,622,000	7,851,000	6,229,000	0·8
Wood and paper.....	32,901,000	228,756,000	195,855,000	25·7
Iron and steel.....	3,347,000	51,138,000	47,791,000	6·3
Non-ferrous metals..	18,863,000	44,358,000	25,495,000	3·4
Non-metallic minerals	5,956,000	27,647,000	21,691,000	2·8
Chemicals.....	455,000	14,047,000	13,592,000	1·8
Miscellaneous.....	8,824,000	14,053,000	5,229,000	0·7
	168,972,000	931,451,000	762,479,000	100·0

*Year ending March 31, 1923.

EXPORTS OF CANADIAN PRODUCTS, FISCAL YEARS, 1900-1923



For comparative purposes the year 1900 offers a convenient starting point. Canada was then just entering the era which so vastly and quickly widened the area of industrial activity and so radically altered the economic complexion of the Dominion. The figures for the year ending March, 1923, do not constitute an ideal basis of comparison with 1900, but are, on the whole, the best available for that purpose. While they require considerable discount to compensate for the upward trend of prices since the opening of the century, they have a distinct advantage in being fairly free from the extraordinary inflation of the war period and immediately succeeding years. Moreover, as they cover a year of widespread business depression, they tend to minimize rather than to exaggerate the real measure of growth and to expose in bold relief those branches of development which have stood up best and contributed most to the commerce of the Dominion under the severe test of "hard-time" conditions.

During the period 1900-1923 exports of Canadian merchandise rose from \$169,000,000 to \$931,000,000. In other words, they increased between four and five-fold in monetary value if not in actual volume. Taking simply the value figures, the exports of last year represented some \$762,000,000 more than those of 1900. Even if it

be assumed that prices over the whole range of exports represented an average increase of 100 per cent over those of 1900, it is obvious that the actual volume of Canada's export trade has nearly trebled in little over twenty years.

DIRECTION OF EXPORTS EXPANSION

The source is no less important than the measure of export growth. The changes in complexion have been quite as remarkable as the increase in volume and value of exports. There has been a notable readjustment in the relative importance of the various classes of commodities, viewed from an export standpoint.

TABLE V.—PROPORTION OF TOTAL EXPORTS OF CANADIAN PRODUCE CONTRIBUTED BY EACH MAIN CLASS, 1900 AND 1923

*Class of merchandise	Per cent of total exports, 1900	Per cent of total exports, 1923	Per cent increase in exports of each class
Agricultural and vegetable products..	16.7	43.8	1,344
Animal products.....	34.1	11.6	88
Fisheries products.....	6.6	3.0	146
Fibres and textiles.....	1.0	0.8	384
Wood and paper.....	19.5	24.5	595
Iron and its products.....	2.0	5.5	1,428
Non-ferrous metals.....	11.1	4.8	135
Non-metallic minerals.....	3.5	3.0	364
Chemical products.....	0.3	1.5	2,987
Miscellaneous.....	5.2	1.5	59

*Each broad class embraces both raw and manufactured materials. Thus "animal products" includes leather as well as live stock, and "vegetable products" covers flour as well as wheat.

The analysis of export trade, as shown in Tables IV and V, demonstrates that two forms of natural resources have attracted the lion's share of new Canadian development in the last two decades, and have been overwhelmingly responsible for the rise in exports. Agricultural and forest resources have been the predominant factors in the Dominion's industrial and commercial progress. Exports of vegetable commodities—embracing chiefly grain and grain products—increased by more than 1,300 per cent between 1900 and 1923. In the same period exports of wood and paper rose by nearly 600 per cent, the increase in this class being due mainly to the products of pulpwood rather than to saw timber. Approximately three-quarters of the total gain in the value of Canadian exports in 1923, as compared with 1900, must be credited to vegetable and forest products. The exports of these two classes alone now amount to more than three times the value of Canada's exports in 1900 of all classes of products, vegetable, mineral, forest, animal, fisheries, etc.

The growth in the export of pulpwood and grain products has been so exceptionally rapid as to change the whole aspect of Canadian export trade. Since 1900 the proportion of the total exports contributed by vegetable products (largely

wheat and flour) increased from 17 per cent to 44 per cent, while the proportion represented by wood and paper rose from 20 per cent to 25 per cent. The exports of iron and its products also show a decided rise, due largely to the growth of the automobile industry. The increases in these particular classes have inevitably reduced the comparative importance of several other main classes of merchandise, such as non-ferrous metals and fisheries and animal products. It must be borne in mind, however, that their decline relates solely to the proportion and not to the value or volume of their contribution to total exports. It does not denote actual retrogression, but merely failure to keep pace in export expansion with the rising tide of vegetable and forest products.

The other broad classes of merchandise—fibres and textiles, non-metallic minerals, chemicals and miscellaneous products—together account for a considerable volume of export trade, but no one of them individually contributes a very high percentage of total exports. It is true that exports of chemical products have recorded an astonishing rate of growth, but they still represent a distinctly minor proportion of the Dominion's total external sales.

CANADA BUYS HEAVILY ABROAD

Canada is characterized no less by heavy imports than by the great volume of her exports. While her natural resources have enabled her to pour into the channels of international commerce an increasing stream of raw and manufactured products, she has always been compelled to purchase abroad a wide range of commodities which her own resources lack entirely, or yield too sparingly.

The balance of trade has been subject to very pronounced fluctuation. Within the last ten years the Dominion's external trade has shown successively a series of heavy adverse balances, a series of even heavier favourable balances and, more recently, a closer approach to an equality of exports and imports. A large and growing excess of imports marked the period from the opening of the century until the outbreak of the war, when Canada was engaged in the rapid extension of development and in great construction enterprises. The war years brought a sudden reversal, and the exports of food supplies, munitions, etc., quickly created a large favourable balance of trade. The past three years, lacking the stimulation either of great domestic development or of war-time markets, have tended to lessen the spread between Canada's sales and purchases abroad. Added to these conditions the decline of prices and the

comparatively tranquil state of trade have had the effect of making the recent external trade statistics unusually trustworthy in revealing the commercial character of the Dominion when entirely free from the misleading features of "boomtime" conditions.

The following table, showing the exports and imports by main classes, for the year ending March, 1923, exhibits the broad features of Canada's international commerce. The accompanying figure illustrates in more graphic manner how heavily the Dominion is a creditor or debtor country in regard to the various broad items of trade.

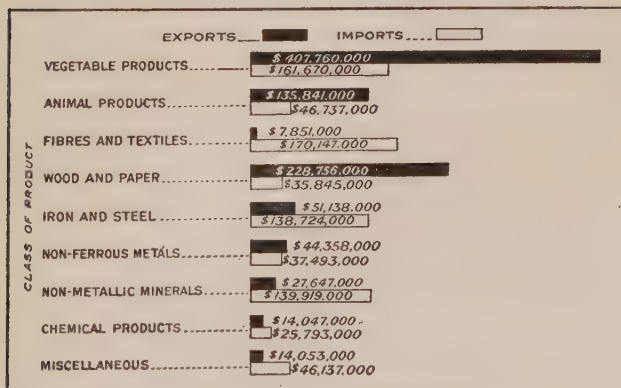
TABLE VI.—EXPORTS AND IMPORTS BY MAIN CLASSES

Class of product	Exports in 1923	Imports in 1923	Favourable or adverse balance
	\$	\$	\$
Vegetable products.....	407,760,000	161,670,000	+246,090,000
Animal products.....	135,841,000	46,737,000	+ 89,104,000
Fibres and textiles.....	7,851,000	170,147,000	-162,296,000
Wood and paper.....	228,756,000	35,845,000	+192,911,000
Iron and steel.....	51,138,000	138,724,000	- 87,586,000
Non-ferrous metals.....	44,358,000	37,493,000	+ 6,865,000
Non-metallic minerals..	27,647,000	139,919,000	-112,272,000
Chemical products.....	14,047,000	25,793,000	- 11,746,000
Miscellaneous.....	14,053,000	46,137,000	- 32,084,000
	931,451,000	802,465,000	+128,986,000

It is to be noted that vegetable, animal, and wood and paper products are ordinarily exported in much greater volume than they are imported,

whereas fibres and textiles, iron and its products, and non-metallic minerals are purchased much more heavily than they are sold abroad. Chemical and miscellaneous products likewise leave a national trade deficit. The very heavy excess of imports on several classes of goods and the equally striking surplus on other classes do not furnish an accurate reflection of Canada's wealth or poverty in natural resources of different forms. To some extent they denote natural limitations, such as those affecting the production of raw textiles or the use of native resources of coal and iron. But to a great degree they reflect, rather, the temporary commercial status of a new country where the work of diversifying industry still enjoys much room for advance.

EXPORTS AND IMPORTS BY MAIN CLASSES, 1923



The trade statistics, compiled according to certain broad classes of merchandise, exhibit the more general characteristics of Canada's international commerce. The actual commercial status of the Dominion is more clearly disclosed by an examination of the particular commodities which enter largely into exports and imports.

PRINCIPAL COMMODITIES OF EXPORT

Although Canada has made exceptional progress, not only in primary development but likewise in the field of manufacture and secondary industry, a relatively small number of commodities, or of closely related groups of commodities, contribute a high percentage of the total exports. In the year ending March, 1923, the following ten items represented exports to the value of more than \$718,000,000, or over 77 per cent of the total exports of the Dominion.

TABLE VII.—PRINCIPAL ARTICLES OF EXPORT

Commodity	Value of exports	Percentage of total exports
Wheat and wheat flour.....	\$312,200,000	33.5
Lumber, lath and shingles.....	92,700,000	9.9
Paper.....	79,600,000	8.6
Pulpwood and woodpulp.....	53,700,000	5.8
Animals and meats.....	39,600,000	4.3
Implements and vehicles.....	35,800,000	3.8
Oats, barley and rye.....	31,900,000	3.4
Butter and cheese.....	29,100,000	3.1
Fish.....	27,500,000	2.9
Furs.....	16,400,000	1.8
Total exports of items specified above. . . .	\$718,500,000	77.1
Total exports of all Canadian merchandise.	931,451,000	100.0

The commodities enumerated above regularly contribute a high percentage of the total exports, although they may not uniformly constitute the ten leading items of export. A very substantial export trade, varying from year to year in actual value, is also carried on in fruits and vegetables, coal and asbestos, hides, skins and leather, gold, silver, nickel, copper, aluminium, zinc, lead and other metals, seeds, farm implements and automobiles, and there are considerable exports of sugar, rubber, and other products which are manufactured extensively from imported raw materials. Grain and forest products in raw or manufactured forms, however, may fairly be said to dominate the export trade of the Dominion. Wheat and wheat flour constitute the chief pillar upon which the commercial structure of the Dominion rests, and wheat stands foremost among natural products as a factor in Canada's trade abroad.

PRINCIPAL COMMODITIES OF IMPORT

The import side of Canada's external trade naturally includes a wider range of merchandise, with more individual commodities figuring largely but with none so outstanding as wheat among the chief articles of export. The following sixteen items, or groups, accounted last year for a total value of \$524,600,000, or 65 per cent of the

Dominion's entire imports in that year. They furnish a fair indication of the character of merchandise which Canada purchases regularly and largely abroad.

To the tabulation below must also be added a number of other important items or groups, such as iron ore, hardware, cutlery, tools and other steel products, corn and rice, medicines, drugs, and dyeing and tanning chemicals, books and printed matter, as well as many other products which domestic production does not adequately supply owing to the lack either of suitable basic resources or of certain highly specialized industries.

TABLE VIII.—PRINCIPAL COMMODITIES OF IMPORT

Commodity	Value of imports	Per cent of of total imports
	\$	
Coal and coke.....	76,400,000	9.5
Cottons.....	68,700,000	8.6
Wool.....	45,700,000	5.7
Sugar.....	39,600,000	4.9
Implements and vehicles.....	37,500,000	4.7
Rolling mill products.....	36,600,000	4.6
Petroleum.....	35,700,000	4.4
Engines and machinery.....	31,100,000	3.9
Fruit and nuts.....	30,100,000	3.8
Hides, leather and furs.....	21,700,000	2.7
Silk.....	21,200,000	2.6
Beverages (alcoholic).....	20,900,000	2.6
Tobacco and rubber.....	17,000,000	2.1
Tea, coffee and cocoa.....	16,600,000	2.1
Clay and glass products.....	13,900,000	1.7
Flax, hemp and jute.....	11,900,000	1.5
Total imports of items specified above.....	524,600,000	65.4
Total imports for domestic consumption...	802,465,000	100.0

DIFFUSION OF CANADIAN TRADE

The trade of Canada abroad is predominantly with the United Kingdom and the United States,—mother country and nearest neighbour, respectively. The record of later years shows a tendency toward a greater diffusion of Canadian exports beyond these chief markets, mainly due to the growth in the volume of the Dominion's surplus products, particularly wheat, wheat flour, pulp and paper, and to the consequent need for seeking markets wherever available. The percentage of exports taken by the United States has risen noticeably in very recent years, largely through the enormous purchases of Canadian pulp and paper.

TABLE IX—PROPORTION OF CANADIAN EXPORTS AND IMPORTS TO AND FROM THE UNITED KINGDOM, UNITED STATES AND OTHER COUNTRIES.

Year	Exports to			Imports from		
	United Kingdom	United States	Other countries	United Kingdom	United States	Other countries
	p.c.	p.c.	p.c.	p.c.	p.c.	p.c.
1902.....	55.8	33.9	10.3	24.9	58.4	16.7
1914.....	48.8	38.9	12.1	21.4	63.9	14.8
1915.....	46.0	40.3	13.7	19.8	65.3	14.9
1916.....	59.4	27.9	12.7	15.2	72.8	12.0
1917.....	64.1	24.6	11.3	12.7	78.5	8.7
1918.....	54.3	27.7	17.9	8.4	82.2	9.4
1919.....	44.1	36.8	18.3	7.9	81.6	10.5
1920.....	38.6	39.0	22.5	11.8	75.3	12.9
1921.....	26.3	45.6	28.1	17.3	69.0	13.7
1922.....	40.4	39.7	19.9	15.7	69.0	15.3
1923.....	40.7	39.6	19.7	17.6	67.4	15.0

With regard to imports, the war had the natural effect of swelling the percentage supplied by the United States, but the proportion of imports purchased from countries other than the United States and Great Britain has shown no appreciable advance.

Aside from the trade with Great Britain and the United States, Canada naturally enjoys a very important commercial connection in respect to both imports and exports with portions of the British Empire other than the mother country.

While the foregoing table illustrates very effectively the main channels followed by Canadian trade, a clearer conception of the diffusion of Canada's products and of the sources of her purchases is gained from the following statement of the value of imports and exports for the year ending March, 1923, by principal countries. As no single year is without some marked departures from normal conditions, this table must be regarded as suggestive rather than as strictly typical of value and volume of trade with various nations.

The direction of Canadian commerce is remarkable by virtue of the balance as well as the volume of trade with the United Kingdom and the United States. The balance in each case is very uneven. With the former the annual trade yields a balance strongly in Canada's favour

but with the United States a heavy adverse balance is incurred. In regard to other countries the balances are infinitely smaller and less important in their effect upon the Dominion's financial adjustments.

TABLE X.—IMPORTS AND EXPORTS BY PRINCIPAL COUNTRIES, YEAR ENDING MARCH, 1923

Country	Value of exports of Canadian merchandise	Per cent of total exports	Value of imports for consumption	Per cent of total imports
British Empire—				
United Kingdom.....	\$379,067,000	40·7	\$141,288,000	17·6
Australia.....	18,784,000	2·0	1,458,000	0·2
Bermuda.....	1,078,000	0·1	95,000	0·0
British East Indies.....	2,864,000	0·3	12,383,000	1·5
British Guiana.....	2,083,000	0·2	5,669,000	0·7
British South Africa...	5,583,000	0·6	185,000	0·0
British West Indies....	9,533,000	1·1	12,424,000	1·6
Hong Kong.....	1,944,000	0·2	1,879,000	0·2
Newfoundland.....	8,523,000	0·9	1,401,000	0·2
New Zealand.....	8,286,000	0·9	1,963,000	0·3
Other British Empire..	1,880,000	0·2	813,000	0·1
Total British Empire....	439,625,000	47·2	179,558,000	22·4
Argentina.....	4,445,000	0·5	3,076,000	0·4
Belgium.....	12,528,000	1·3	4,995,000	0·6
Brazil.....	1,929,000	0·2	1,391,000	0·2
China.....	5,126,000	0·5	1,461,000	0·2
Cuba.....	5,069,000	0·5	11,210,000	1·4
France.....	14,119,000	1·5	12,250,000	1·5
Germany.....	9,951,000	1·1	2,567,000	0·3
Greece.....	6,596,000	0·7	468,000	0·1
Italy.....	12,073,000	1·3	1,598,000	0·2
Japan.....	14,510,000	1·6	7,211,000	0·9
Mexico.....	3,291,000	0·4	3,851,000	0·5
Netherlands.....	10,540,000	1·1	4,958,000	0·6
Norway.....	2,217,000	0·2	560,000	0·1
Sweden.....	2,574,000	0·3	486,000	0·1
Switzerland.....	519,000	0·1	7,736,000	0·9
United States.....	369,080,000	39·6	540,917,000	67·4
Other foreign countries...	17,259,000	1·9	18,172,000	2·2
Total foreign.....	491,826,000	52·8	622,907,000	77·6
Total all countries.....	931,451,000	100·0	802,465,000	100·0

The foregoing general survey of the broad features of Canada's international commerce fails entirely to picture the true economic status of Canada, if it does not clearly establish the fundamental fact that the Dominion is intrinsically a trading country. The natural resources from which its commerce flows are varied and of generous extent. But they likewise exhibit important limitations.

Canada is a land of vast grain growing areas and a wide diversity of other vegetable resources, but the Dominion grows no cotton or rubber, and looks largely abroad for sugar, tobacco and many other vegetable commodities. Canada is rich in minerals but her most populous provinces depend mainly upon imported fuel. Her animal industries are a leading source of national wealth, but wool production falls far short of domestic requirements. Forest products yield a huge surplus for export, but are largely offset by the imports of iron and steel.

In short, Canada's natural resources are such that the fuller exploitation of the national domain will, in all probability, spell for the Dominion a wider participation in international trade rather than an unique degree of self-sufficiency. Canada is committed to a career of foreign commerce on a large scale no less by the limitations than by the diversity and abundance of her physical assets.



A MIXED FARMING DISTRICT IN EASTERN CANADA

CHAPTER III

Agricultural Resources and Development

AGRICULTURE is the economic heart of Canada. Among the natural resources of the Dominion arable lands stand unrivalled. It is difficult to appraise adequately the degree to which they are responsible for sustaining the industrial and commercial life of Canada regarded as a whole. Lumbering, mining, and fishing in the sphere of primary production, the secondary industries of manufacture, the essential services rendered by transportation systems and by purely commercial enterprise—all contribute materially to national income and development. But agriculture is the preëminent basic activity by which Canada's economic stature and character have been determined. It forms the chief direct means of livelihood and, moreover, the rural population of the Dominion—constituting both a broad consuming market and a large reservoir of raw materials—is an indirect but vital factor in fostering

extensive communities engaged in other phases of primary industry as well as in manufacture and commerce.

CANADA'S ESTATE IN ARABLE LANDS

Canadian agriculture rests upon an unusually generous endowment of cultivable lands. Present information permits only a rough estimate of their actual extent, but it is certain that for many years it will still be necessary to measure the Dominion's total arable area mainly by the untilled acreage rather than by that under cultivation. Of the 300,000,000 acres believed to be physically suitable for agriculture, only 60,000,000 acres, or one-fifth of the total, have been placed under field crops. The remaining four-fifths, comprising some 240,000,000 acres, are capable of sustaining many added millions of population, and they include an immense acreage sufficiently ripe for settlement as to ensure that the extension of agriculture will continue to be a main highway of Canada's material progress. Despite the rapid advance of settlement during the last two decades there are today, in the three prairie provinces of Manitoba, Saskatchewan and Alberta alone, at least 25,000,000 acres of unoccupied lands situated within fifteen miles of existing railways and available for purchase at figures representing but

a fraction of the values placed upon lands of no greater fertility in the older farming communities of the Dominion and of the United States.

TABLE XI—ARABLE AND CULTIVATED AREAS IN CANADA

Province	Arable area* (estimated)	Proportion of total arable area of Canada	Area under field crops 1922	Proportion of total area under field crops in Canada 1922
	acres	per cent	acres	per cent
Nova Scotia.....	5,000,000	1.7	789,000	1.4
Prince Edward Island....	1,200,000	0.4	543,000	0.9
New Brunswick.....	10,000,000	3.3	1,206,000	2.1
Quebec.....	40,000,000	13.3	7,435,000	13.0
Ontario.....	55,000,000	18.3	10,259,000	17.9
Manitoba.....	25,000,000	8.3	6,758,000	11.8
Saskatchewan.....	70,000,000	23.3	19,833,000	34.7
Alberta.....	72,000,000	24.0	10,006,000	17.5
British Columbia.....	22,000,000	7.4	372,000	0.7
	300,200,000	100.0	57,201,000	100.0

*Includes grazing lands

The distribution of arable lands is such that Canada possesses not an unbroken belt but a series of agricultural areas between Prince Edward Island on the Atlantic coast and Vancouver Island on the Pacific, characterized by diversity of contour, soil and climate, and by corresponding variety of crop production. Each of the nine provinces includes extensive arable areas and supports agricultural development on a very substantial scale. The estimates of the areas in the

various provinces regarded as actually or potentially valuable for agriculture are subject to revision as more complete data become available but, in conjunction with the statistics of the acreage already placed under field crops, they serve to suggest the magnitude of the present agricultural industry of Canada and of the lands which invite new or more intensive settlement.

The acreage under field crops does not constitute the entire area occupied as farm lands. A large addition is required to include the acreage devoted to orchards, grazing and other purposes. But a liberal allowance for such uses as are not covered by the term "field crops" still leaves it clearly evident that the existing measure of agricultural development is but an indication of the Dominion's potential capacity for food production, whether it be in the form of grain, vegetable and other field crops, or of livestock and animal products representing the finished output of mixed farming.

EXPANSION OF AGRICULTURE

Despite the great proportion of the total arable area which remains wholly or mainly unutilized, Canada has reared an agricultural industry of large dimensions. The present volume and value of farm production is derived chiefly from the long established and diversified agriculture

of Eastern Canada—Ontario, Quebec and the Atlantic provinces of Nova Scotia, New Brunswick and Prince Edward Island—but a very considerable portion of the output is also produced by the vast areas placed under cultivation in Western Canada during recent years. The leadership of the older provinces in point of value of farm output is due to well-developed dairy industries, particularly in Ontario. In regard to field crops, alone, first rank in 1922 belonged to Saskatchewan, settled largely within the past twenty years.

TABLE XII.—ESTIMATED GROSS AGRICULTURAL REVENUE OF CANADA, 1900 AND 1922

	Value of production, 1900	Value of production, 1922	Increase in value 1900-1922
	\$	\$	\$
Field crops.....	194,953,000	962,526,000	767,573,000
Farm animals.....	75,707,000	77,548,000	1,841,000
Wool.....	1,887,000	3,180,000	1,293,000
Dairy products.....	66,471,000	250,618,000	184,147,000
Fruits and vegetables...	12,995,000	55,855,000	42,860,000
Poultry and eggs.....	10,287,000	58,815,000	48,528,000
Miscellaneous.....	2,607,000	11,628,000	9,021,000
	364,907,000	1,420,170,000	1,055,263,000

A comparison of the monetary sum of agricultural revenue in the years 1900 and 1922 indicates both the financial stature of Canadian agriculture today and the extent to which it represents the achievement of the present century. As the figures are based upon estimates, not upon complete returns of actual production, and are

further subject to the limitations imposed by one-year periods, the comparison must be regarded as suggestive rather than as strictly representative of the advance of farming enterprise.

TABLE XIII.—SOURCES OF AGRICULTURAL REVENUE
1900-1922

Item of production	Proportion of total revenue as estimated for 1900	Proportion of total revenue as estimated for 1922	Rate of increase in revenue from each item between 1900 and 1922
	per cent	per cent	per cent
Field crops.....	53.5	67.8	394
Farm animals.....	20.7	5.5	2
Wool.....	0.5	0.2	69
Dairy products.....	18.2	17.7	277
Fruits and vegetables.....	3.6	3.9	330
Poultry and eggs.....	2.8	4.1	472
Miscellaneous.....	0.7	0.8	346

In the period 1900-1922 the gross agricultural revenue of Canada almost quadrupled. While the monetary sum of Canadian farm output, as a whole, increased by an amount estimated at some \$1,055,000,000, the various broad items of production, such as field crops, farm animals, etc., did not contribute to the increase nor share the basic growth in uniform degree. Progress was much more pronounced in certain directions than in others. The great rush of land-seekers to the virgin areas of Manitoba, Saskatchewan and Alberta, where they engaged immediately in grain-growing and enjoyed a quick cash return from

wheat, carried the field crop revenues upward at an exceptional rate. Thus, while the value of the farm output was multiplying several-fold, the general aspect of the agricultural industry of the Dominion was being altered very materially. There was a decided change in the relative importance of the chief items or sources of production.

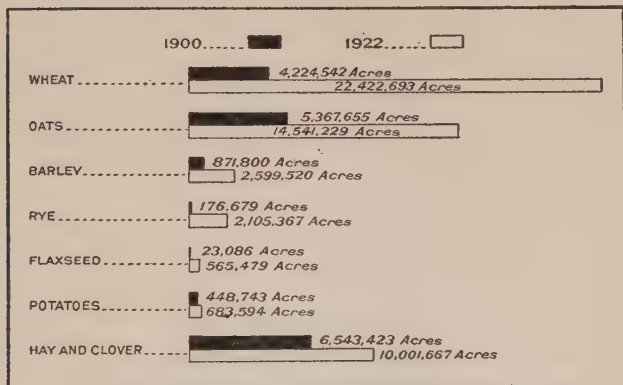
The year 1922 was marked by adverse marketing conditions, which affected the livestock industries more than most other phases of farm production, and the shifting in the relative importance of the various items of output, as indicated in Table XIII, is not wholly trustworthy. For instance, the relative importance of farm animals as a source of agricultural revenue in 1921 and 1922 was greatly reduced by the fact that the values of live stock declined much more severely than the values of dairy products. The table, however, illustrates the broad fact that the growth in the value of agricultural revenue in Canada is traceable in very large measure to the great rise in field crop production. In rate of increased dairying has also made a splendid record, and it is significant that dairy products have greatly surpassed farm animals, or slaughter stock, as a revenue-producing industry. The revenues from fruit, vegetables, poultry, eggs and miscellaneous items have shown substantial advance, but they do not constitute a large proportion of the total revenue from the agricultural pursuits.

EXTENSION OF CULTIVATED AREAS

The increase in revenue is a useful but not an entirely satisfactory measure of progress, since it reflects to some extent merely a rise in prices. The real growth of agricultural development is disclosed more accurately by the increases in the acreages under cultivation and in the numbers of farm animals. Comparisons based on these indices demonstrate that the rise in the monetary value of the output is the result mainly of actual extension of farming enterprise, and is due only in minor degree to the upward movement of prices in the last two decades.

TABLE XIV.—ACREAGE UNDER FIELD CROPS,
1900-1922

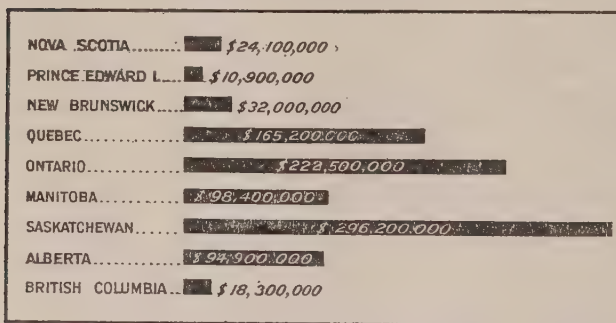
Field crops	1900	1922	Increase 1900-1922	Rate of increase	Proportion of total increase
	acres	acres	acres	per cent	per cent
Wheat.....	4,224,542	22,422,693	18,198,151	431	48.6
Oats.....	5,367,655	14,541,229	9,173,574	171	24.5
Barley.....	871,800	2,599,520	1,727,720	198	4.6
Rye.....	176,679	2,105,367	1,928,688	1,090	5.2
Flaxseed.....	23,086	565,479	542,393	2,358	1.5
Other grains.....	1,612,928	1,798,968	186,040	12	0.5
Potatoes.....	448,743	683,594	234,851	52	0.6
Roots.....	205,160	244,981	39,821	19	0.1
Hay and clover...	6,543,423	10,001,667	3,458,244	53	9.2
Other fodders.....	276,350	2,237,183	1,960,833	710	5.2
Totals.....	19,750,366	57,200,681	37,450,315	190	100.0

INCREASE IN PRINCIPAL FIELD CROP ACREAGES IN
CANADA, 1900-1922

The acreage under field crops in Canada has almost trebled since 1900, and nearly 37,500,000 acres of new land was brought under cultivation—an area slightly larger than that of England and Wales combined. More than 27,000,000 acres, or about three-quarters of the total addition to the cultivated area, was placed under wheat and oats. The acreages devoted to rye and to flax grown for seed, the latter a crop used widely on new land, increased at even more remarkable rates than the wheat and oats areas, but do not form a large proportion of the total land under tillage. While the hay and clover acreage was extended by more than 3,400,000 acres, the increase

does not compare with the rate of growth achieved by wheat and oats. Broadly viewed, the outstanding feature of progress in field husbandry has been the huge expansion of grain crop acreage, resulting from the settlement of the prairies of the Canadian West.

ESTIMATED VALUE OF CANADIAN FIELD CROPS
BY PROVINCES, 1922



The mixed farming of Ontario, Quebec and the Atlantic provinces has not paralleled the advance of the grain-growing western provinces, but Eastern Canada still accounts for the major portion of the Dominion's total agricultural revenue. The agriculture of the older provinces has been maintained exceptionally well in view of the many factors which have tended to draw population away from the long-established farming communities. During the period when western

colonization was at its height, the irresistible inducements of free lands, of prompt and liberal cash returns from wheat, and of rapidly rising land values attracted many thousands of farmers from the solid prosperity but more moderate financial rewards of eastern agriculture.

As an outcome of the transformation effected by the spread of settlement over the fertile plains of Manitoba, Saskatchewan and Alberta, which were virtually untouched by the plow less than a generation ago, grain growing in Canada now rivals mixed farming in value of output, and the newer farming provinces stand high in regard to the relative importance of their contributions to the gross agricultural revenue of the Dominion.

TRANSCENDING INFLUENCE OF WHEAT

Among Canadian field crops wheat stands first. No other natural product, whether of agricultural, forest, mineral or marine origin, has exercised such vitalizing influence upon the economic life of Canada in recent years. Wheat has been the most powerful factor in attracting population and capital to the Dominion, in bringing virgin areas under cultivation, in widening the market for domestic manufacturing, mining and other industries, in building up the volume and value of export trade, and in creating the

purchasing power necessary to finance Canada's heavy imports of textiles, iron and steel, sugar, coal and other essentials which, for various reasons, are drawn wholly or largely from abroad.

At the opening of the present century, the excellence of Canadian hard wheat had gained recognition in the world's principal grain markets, but the colonization of the wheat-lands of Western Canada had scarcely begun. Then came the tide of settlement, and Canadian wheat production rose from 56,000,000 bushels in 1900 to 132,000,000 bushels in 1910, and to the record total of 400,000,000 bushels in 1922.

The statistics of yearly crops give but a faint picture of the manner in which wheat has impelled the material progress of Canada. When Western Canada finally captured the faith of the land seeker, when the delusions respecting its climate and fertility were definitely swept away, population and railways advanced more rapidly than they had ever before invaded a new country. In the period 1901-1921 the territory embraced by the present provinces of Alberta and Saskatchewan increased eight-fold in population, and the occupied farm lands spread over some 85,000,000 acres.

In tapping the fertility of the prairies, wheat merely commenced a fresh career of accomplishment by virtue of which it richly merits the title



A PANORAMA OF ONTARIO ORCHARDS

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WITHDRAWN

of economic fairy to the industrial and commercial life of Canada. It built practically the whole economic structure of the Prairie Provinces, and the effects of the development of those provinces have penetrated almost every phase of industry and commerce throughout the Dominion. The lumberman and the fruit-grower of British Columbia saw the rise of a vast new market for their products, the coal resources of Alberta were opened, flour mills and factories in Ontario and Quebec were enlarged and multiplied, the commerce of eastern seaports grew apace. In short, it may be truly said that the whole business life of Canada was quickened by the wheat-fields of Manitoba, Saskatchewan and Alberta.

The grain trade itself excites wonder—not by its remarkable growth alone. Its task calls for a marvel of organization. As soon as threshing commences in the autumn an avalanche of grain begins to move forward from the farms of Manitoba, Saskatchewan and Alberta. The volume of wheat to be marketed is immense, the wheatfields are far removed from the seaboards, and the Pacific ports as yet are equipped to handle only a small share of the movement. The great problem is to forward as much of the crop as possible before winter closes navigation on the unique Great Lakes-St. Lawrence system of inland waterways leading to Montreal and the Atlantic ports.

There is nothing more impressive in Canada's commercial life than the precision and smoothness with which the machinery of the grain trade performs its huge task. Railways, banks, grain dealers, lake carriers, ocean port authorities, the elevators in the wheatfields, at the head and foot of the Great Lakes and at the seaboard—these and other interests work at top speed to receive, clean, grade and forward in constant flow as great a stream of grain as the various carrying and transshipping facilities can handle. The rapidity of the movement is astonishing. The twin ports, Fort William and Port Arthur, at the head of the Great Lakes, received by railways 186,000,000 bushels of grain during the three months September, October and November, 1922. In the same period 176,000,000 bushels were transhipped and forwarded from those ports by lake carriers to eastern ports and world markets. The elevators at Fort William and Port Arthur alone have a storage capacity of sixty-five million bushels. To keep pace with the requirements of the grain trade the number of elevators in the Dominion has increased from 523 in 1901 to 4,020 in 1922, and their capacity from 18,000,000 bushels to 238,000,000 bushels.

The limits of Canada's wheat-producing capacity have not yet been approached, even by the great crops of 1915 and 1922, aggregating nearly



CANADA'S WHEAT FIELDS EXCEED 22,000,000 ACRES

400,000,000 bushels. It is unlikely that the many millions of acres in Western Canada that still remain unoccupied in close proximity to existing railways will experience such rapid colonization as occurred between 1900 and the outbreak of war but, with the more gradual settlement of these areas, wheat will inevitably continue to wield a powerful influence upon the growth of the Dominion.

The dominant position held by wheat in Canadian field husbandry today is illustrated by the following table:—

TABLE XV.—FIELD CROP PRODUCTION OF CANADA

(Average annual acreage, production and value of principal field crops for the five-year period 1918-1922, inclusive)

Field crop	Average area under crop	Average production	Average value
	acres		\$
Wheat.....	20,079,000	269,234,000 bus.	369,822,000
Hay and clover.....	10,427,000	14,063,000 tons	278,174,000
Oats.....	15,417,000	453,776,000 bus.	252,084,000
Potatoes.....	745,000	112,801,000 "	96,680,000
Barley.....	2,749,000	65,712,000 "	52,224,000
Turnips, mangolds, etc....	277,000	103,695,000 "	41,186,000
Fodder corn.....	569,000	5,523,000 tons	36,280,000
Mixed grains.....	855,000	29,183,000 bus.	27,628,000
Corn for husking.....	284,000	14,838,000 "	17,481,000
Rye.....	1,181,000	16,769,000 "	15,231,000
Flaxseed.....	938,000	5,729,000 "	14,328,000
Buckwheat.....	433,000	9,770,000 "	12,158,000
Alfalfa.....	246,000	599,000 tons	11,231,000
Peas.....	207,000	3,489,000 bus.	8,551,000
Beans.....	105,000	1,722,000 "	7,457,000
Grain hay ¹	291,000	27,413,000 tons	6,590,000
Tobacco.....	27,000	27,057,000 lbs.	6,545,000
Flax fibre.....	17,000 ²	148,000 tons	3,249,000 ³
Sugar beets.....	26,000	258,000 "	2,594,000

(1) 4 years, 1919-22. (2) 5 years 1917-21. (3) 3 years 1917-19.

The records upon which the foregoing table has been based cover, in part, the period prior to the sharp descent of prices which occurred in 1921, but although the monetary values are on a somewhat higher level than now prevails, the figures suggest the diversity and relative value of the principal Canadian field crops. Among the grains oats are surpassed in importance only by wheat, and their production is much more widely distributed. More than nine-tenths of the wheat crop is grown in Manitoba, Saskatchewan and Alberta, but those provinces produce a much smaller proportion of the oat crop, which is a mainstay of the mixed farming of the east as well as of the cereal farming of the west. In the latter instance oats are an important commercial crop and, in the former, a principal support of the stock-raising and dairying industries from which the farm income is largely derived.

Of the less prominent grains none approaches wheat or oats but, in the aggregate, barley, mixed grains, corn, flaxseed, buckwheat, rye, peas and beans represent a very substantial portion of the total value of field crops. Flaxseed is almost exclusively a western crop, and barley and rye are predominantly so. Corn, buckwheat and peas are essentially eastern crops. Corn is utilized chiefly as ensilage and is especially valuable in connection with the dairying industry.

In both acreage and value the hay and clover crop ranks second, and greatly surpasses all other crops except wheat and oats. Quebec and Ontario together account for the bulk of this crop, with the Atlantic provinces also heavy producers. The grain-growing provinces of the west contribute only a minor portion of the total. Alfalfa is grown mainly in Ontario and the output is small in comparison with that of hay and clover.

Field husbandry in Canada is by no means limited to grain and forage crops. Potatoes are an important item of agricultural revenue, ranking fourth, and being exceeded only by wheat, oats, and the hay crop. The acreage devoted to potatoes has not increased greatly in recent years. Turnips and mangolds are grown in great quantities in the mixed farming provinces, supplementing the coarse grain and fodder crops in sustaining the animal industries. Tobacco-growing, which has been carried on during a considerable period in Ontario and Quebec, has become a well-established branch of agriculture, and the cultivation of flax for fibre has made decided progress in very recent years. Sugar beets are grown on a commercial scale, but the output has fluctuated widely and the sugar-refining industry of Canada depends mainly upon the imported raw product.

ANIMAL INDUSTRIES

The animal industries of Canada are linked much more closely with agriculture than with strictly pastoral resources. The western provinces include extensive grazing lands, but the live stock production of the Dominion at large is mainly a subsidiary of mixed farming and in only limited degree an independent form of primary industry. As a ranching country Canada does not rival Australia or the Argentine Republic, with their vast pastoral areas and immense herds of cattle and flocks of sheep.

Nevertheless, the animal industries of the Dominion are highly developed and contribute heavily to national income and prosperity. Their high standing is due to the expansion of the dairying industry rather than to the production of slaughter stock, although the latter is by no means unimportant. The comparative proportions of stock-raising and of dairying, and the extent to which these two chief branches of animal industry have been developed in the different provinces, are indicated by Table XVI. It is significant of the general status of animal industries in Canada that the value of the dairy output normally exceeds by a wide margin the value of the total production of farm animals, including cattle, horses, sheep, swine and all others. The relative standing of

dairy production, however, has been exaggerated, particularly since 1920, by the fact that dairy products have not fallen in value to nearly the same extent as has the value of the animals themselves.

TABLE XVI.—AVERAGE ANNUAL REVENUE FROM FARM ANIMALS AND DAIRY PRODUCTS FOR THE FIVE-YEAR PERIOD 1918-1922 INCLUSIVE

	Farm animals		Dairy products	
	Value	Proportion of total for Canada	Value	Proportion of total for Canada
	\$	per cent	\$	per cent
Nova Scotia.....	3,635,000	2.6	3,904,000	1.6
Prince Edward Island	1,617,000	1.1	1,941,000	0.8
New Brunswick.....	3,446,000	2.5	1,929,000	0.8
Quebec.....	29,676,000	21.2	64,751,000	26.6
Ontario.....	54,135,000	38.6	125,878,000	51.9
Manitoba.....	8,916,000	6.4	13,052,000	5.4
Saskatchewan.....	16,163,000	11.5	8,754,000	3.6
Alberta.....	19,954,000	14.2	13,945,000	5.8
British Columbia....	2,675,000	1.9	8,411,000	3.5
Totals.....	140,217,000	100.0	242,565,000	100.0

LIVE STOCK

The Canadian stock-raising industry has advanced at but a moderate rate in recent years as contrasted with grain-growing. The measure of growth in mixed farming and in live stock production has been inevitably restricted by the great financial attractions offered by the new

grain growing areas. At the same time the extension of cultivation in the west has materially reduced the area of land available for ranching purposes.

TABLE XVII—NUMBERS OF FARM ANIMALS, 1901-1922

	1901	1922	Increase	Per cent
Horses.....	1,577,493	3,648,871	2,071,378	131
Milch cows.....	2,408,677	3,745,804	1,337,127	56
Other cattle.....	3,167,774	5,974,065	2,806,291	89
Sheep.....	2,510,239	3,263,525	753,286	30
Swine.....	2,353,828	3,915,684	1,561,856	66
Total.....	12,018,011	20,547,949	8,529,938	71

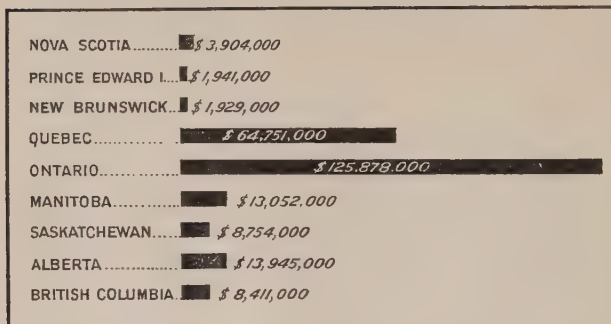
Despite the various adverse factors, which were largely offset after 1914 by wartime conditions, the numbers of farm animals have increased substantially. The rate of increase has been most pronounced in regard to horses, for which class of farm animal the circumstances of the last two decades have been extremely favourable. Large additional numbers of horses have been required to work the vastly extended acreage placed under tillage in Manitoba, Saskatchewan and Alberta. The number of cattle has also grown at a very satisfactory rate, but the sheep industry has not shown steady progress. Swine fluctuate greatly in number from year to year, in accordance with crop and market conditions, but the swine industry normally constitutes a very important branch of stock-raising in Canada.

The future of the live stock industry promises well. As the problem of conserving soil fertility becomes of more pressing concern, the wheat-lands of western Canada will be converted more and more to mixed farming.

DAIRYING

The dairying industry of the Dominion has reached an advanced state of development. Although it is carried on most extensively in Ontario and Quebec, where abundant summer rainfall and temperate climate afford an ample acreage of hay and pasture, there are cheese factories and creameries in all of the provinces, and dairying, especially the manufacture of creamery butter, has progressed steadily in Manitoba, Saskatchewan and Alberta. Canadian cheese, long recognized as representing the highest standard of quality, is made almost exclusively in factories, but about one-half of the butter output is produced on the farms and approximately one-half by creameries. In 1921 the dairy factories throughout Canada numbered 3,114, supported by 312,369 patrons, and receiving milk supplies from 1,851,199 cows. The total number of milch cows in the Dominion increased from 2,409,000 in 1901 to 3,745,000 in 1922. The total value of dairy products for the year 1922 was estimated at \$250,000,000.

**AVERAGE ANNUAL REVENUE FROM DAIRY PRODUCTS FOR
THE FIVE-YEAR PERIOD, 1918-1922**



Recent years have brought a marked change within the dairying industry. The most noticeable feature has been the decline in cheese production which, however, is not due in any sense to a corresponding decline in dairying. The manufacture of cheese for export has been reduced by the increased production of butter for domestic consumption and by the quantities of milk required to supply the growing urban communities. Moreover, the expansion of the condensed milk industry has been an important factor in diverting milk from the cheese factories; in 1921 there were 27 establishments engaged in the preparation of condensed milk. The manufacture of ice-cream has still further diminished the quantity of milk available for cheese production.

TABLE XVIII—CHEESE FACTORY AND CREAMERY OUTPUT

Year	Cream- eries	Cheese factories	Combined butter and cheese factories	Creamery butter	Factory cheese
				lbs.	lbs.
1900	629	2,389	558	36,066,000	220,833,000
1910	1,035	2,154	436	64,489,000	199,904,000
1915	950	1,871	678	83,991,000	183,888,000
1916	993	1,813	624	82,564,000	192,969,000
1917	949	1,900	549	87,527,000	194,904,000
1918	990	1,885	476	93,298,000	174,878,000
1919	1,018	1,787	453	103,891,000	166,422,000
1920	1,405	1,683	405	111,692,000	149,202,000
1921	1,092	1,619	376	128,745,000	162,117,000

Canadian dairying will undoubtedly continue to achieve substantial progress. Steady advance is assured by the growing markets for milk and for the increasing variety of milk products, by the attention that is being devoted to improving the dairy herds, and by the fact that dairy farming enhances rather than reduces the productivity of the soil.

FRUIT FARMING

Many portions of Canada are admirably adapted for fruit farming, and the growing of fruit and vegetables adds materially to the sum of agricultural revenue. The most renowned fruit districts of the Dominion are the Annapolis valley of Nova Scotia, the St. John Valley district of New Brunswick, the Niagara peninsula of Ontario and the adjoining counties, and the Okanagan and

other valleys of British Columbia. Both fruit and vegetable growing, however, are very generally carried on beyond those districts where especially favourable conditions have made them the chief enterprise.

TABLE XIX—PRODUCTION AND VALUE OF COMMERCIAL APPLES IN CANADA, 1920 AND 1921

Province	1920		1921	
	Quantity	Total value	Quantity	Total value
	barrels	\$	barrels	\$
Nova Scotia.....	1,160,000	10,931,420	2,036,065	13,478,750
New Brunswick.....	30,000	167,371	33,000	170,940
Quebec.....	88,000	569,688	35,200	251,328
Ontario.....	1,621,800	13,073,765	885,065	6,850,403
British Columbia.....	504,540	5,106,905	1,057,483	9,147,228
Total.....	3,404,340	29,849,149	4,046,813	29,898,649

NOTE.—Included in the above table for 1920 are total export sales amounting to 1,127,400 barrels, of the value, at par rate of exchange, of \$12,470,444, an average price per barrel of \$11.06. The province of Nova Scotia exported almost two-thirds of its total crop of 1920 at an average wholesale price of \$10.60 per barrel. The average wholesale price on the domestic market was \$6.25 per barrel. For the province of British Columbia boxes are expressed as barrels at the rate of three boxes to the barrel.

Of the orchard fruits apples are most important. In number of trees and in quantity of production they greatly exceed all other orchard fruits combined. Peaches, pears, plums and cherries, as well as the small fruits, are also grown in abundance. Extensive vineyards are a prominent feature of the Niagara peninsula, and the grape production is mainly from that area.

The prosperity of fruit farming requires careful study of marketing problems, and in the various regions of Canada that are chiefly devoted to this industry every effort is being made to secure the most efficient marketing organizations and methods.

POULTRY INDUSTRY

Poultry husbandry in Canada is not carried on to a great extent as a single enterprise. Like the growing of fruit and vegetables, it is predominantly associated with ordinary farming activity. The number of poultry of all kinds is estimated at about 43,400,000, hens comprising a very large percentage of the total. Turkeys, geese and ducks together number possibly 3,500,000. The rapid growth of city population in recent years has given an impetus to poultry husbandry as a specialized and distinct form of industry.

AGRICULTURAL COMMERCE

Commodities of vegetable and animal origin normally constitute in value more than one-half of the total exports of Canadian merchandise. In conjunction with the basic activities of cereal production, stock raising, dairying, fruit farming and other branches of husbandry, the Dominion has acquired large industries of secondary character,

notably flour milling, meat packing, the manufacture of milk and cereal products, tanning, and fruit and vegetable canning. Consequently the export trade associated directly or indirectly with agriculture represents a wide range of commodities. The following statement of principal exports of vegetable or animal origin suggests the volume of agricultural commerce and its vital relation to the status of the Dominion as an exporting country. The table is based upon the average annual exports for the three twelve-month periods ending March, 1921, 1922, and 1923.

TABLE XX—PRINCIPAL EXPORTS OF AGRICULTURAL ORIGIN

Commodity	Average annual quantity for three-year period	Average annual value for three-year period	Proportion of value of total exports of Canadian produce
		\$	per cent
Wheat.....	160,260,000 bush.	247,696,000	26.0
Wheat flour.....	7,886,000 brls.	60,025,000	6.4
Cheese.....	1,273,000 cwt.	27,805,000	2.9
Bacon and hams.....	997,000 cwt.	25,680,000	2.7
Oats.....	26,513,000 bush.	15,801,000	1.7
Cattle, living.....	257,000	13,255,000	1.4
Barley.....	11,910,000 bush.	10,152,000	1.1
Apples, fresh.....	1,555,000 brls.	7,869,000	0.8
Rye.....	5,504,000 bush.	5,970,000	0.6
Butter.....	13,388,000 lbs.	5,532,000	0.6
Milk, condensed, etc....	378,000 cwt.	5,506,000	0.6
Hides and skins, raw.....	.....	5,387,000	0.6
Flax seed.....	2,511,000 bush.	5,323,000	0.6
Leather unmanufactured.....	.....	4,876,000	0.5
Beef, fresh.....	365,000 cwt.	4,863,000	0.5
Potatoes.....	3,864,000 bush.	4,827,000	0.5



NOVA SCOTIA APPLES FOR EXPORT

During the three-year period covered by the foregoing table, the fifteen principal animal and vegetable products accounted for about 47 per cent of the total exports of Canadian merchandise, and there were, also, substantial exports of such commodities as rye, oatmeal, hay, clover seed, raw wool, etc.

Agricultural commerce yields the Dominion a large favourable balance but is by no means confined to export trade. The imports annually aggregate a very considerable volume and value. Sugar is the most prominent item of import. Fresh tropical fruits and dried fruits, tobacco, rubber, corn and rice, vegetable oils, nuts, hides, tea, coffee and cocoa, and numerous other commodities of vegetable or animal origin are imported in such quantities as to make Canada a heavy buyer as well as source of agricultural products.

It is significant that, during the ten years 1913-1922, inclusive, Canada's average exports of raw or manufactured commodities, which are classed in the trade returns as vegetable or animal products, exceeded the imports in value by more than \$250,000,000 annually. But it is important to note, also, that in the same period there was an annual trade deficit of some \$133,000,000 in

respect of fibres and textile products which are shown as a separate class of merchandise in the trade returns but are, nevertheless, largely of agricultural or animal origin.

Material assistance is extended by both the federal and the provincial governments to advance the standard of Canadian agriculture. Substantial appropriations are made for the maintenance of experimental work on an extensive scale, of seed and livestock improvement, of marketing facilities, of agricultural schools and colleges and of many additional services designed to promote the most profitable and scientific farming methods.

CHAPTER IV

Forests and Forest Industries*

FOREST areas stand second only to arable lands among the basic resources of Canada, and forest industries have been surpassed by agriculture alone in mothering commercial growth. Their importance as a factor in the rise of Canadian commerce is disclosed by the increase of the Dominion's exports of wood, wood products and paper from about \$42,000,000 in 1903 to nearly \$229,000,000 in the year ending March, 1923.

The work of ascertaining the actual extent of Canada's commercial forests is a large and difficult undertaking and is still far from complete. It is estimated, however, that approximately one-quarter (600,000,000 acres) of the total land area in the Dominion is covered by forest growth. Of this about 150,000,000 acres may be considered as

*Chapter IV—Forests and Forest Industries, prepared by Forestry Branch, Department of Interior.

bearing saw timber of merchantable size, amounting to approximately 550,000,000 M. feet board measure. The balance of the area carries young stands, or timber suitable for pulpwood, fuel, etc. The total pulpwood resources are estimated to be about 1,300,000,000 cords, of which 500,000,000 cords is of saw timber size and is included in the estimate of saw timber. The total stand of timber of all kinds, reduced to board measure, is about 1,000,000,000 M. feet. Of this, over 80 per cent is coniferous.

DISTRIBUTION OF FOREST RESOURCES

The Pacific province of British Columbia contains over two-thirds of the merchantable saw-timber of Canada. The greater part of the timber in that province is found on Vancouver Island and the mainland opposite.

The forest here is almost entirely coniferous, and is made up of the following species: Douglas fir, the most valuable Canadian structural timber, 22 per cent; western cedar, the leading Canadian shingle wood, 22 per cent; spruce, 21 per cent, and western hemlock, 18 per cent, both valuable pulp and lumber species; white fir or balsam, another pulp species, 9 per cent; pine, yellow cypress, cottonwood and other minor species with different uses, 8 per cent.

Owing to abundant rainfall and mild temperature the timber of the Pacific coast reaches a remarkable development. The largest specimens and the heaviest stands of timber in Canada are found on the coast of British Columbia and to a lesser extent in a portion of the south-eastern interior of the province. These regions produce lumber of the largest clear dimensions obtainable in Canada.

The central southern portion of British Columbia is much drier than the coast region and has a more severe climate. It produces Douglas fir of somewhat smaller size than the coast timber, and a considerable quantity of western yellow or "bull" pine, a material similar in many respects to the white pine of Eastern Canada. The great northern interior part of the province supports a heavy growth of smaller-sized timber. Spruce and lodgepole pine form the bulk of this material which at present is not being extensively exploited.

FORESTS OF MIDDLE WEST

The forests of the Prairie Provinces of Canada, including the eastern slopes of the Rocky mountains and the areas north of the treeless plains, are of entirely different character from those of British Columbia. Here spruce and jackpine are the principal coniferous species, with smaller

quantities of balsam fir and tamarack or larch. Poplar comprises about one-third of the stand, but at present it is used chiefly as fuel. The forests in this region will probably be required to supply the local demand, and little or no exportation of saw timber is possible.

FORESTS OF EASTERN PROVINCES

The basin of the St. Lawrence river and of the Great Lakes forms the most important area of commercially valuable forest in Eastern Canada. This is the home of the white pine of commerce, as well as of the white spruce and balsam fir, the two chief pulpwood species. As a result of the clearing of land for agricultural purposes, a large amount of the most valuable hardwoods that originally grew in the southern part of this region has been removed. The white pine, while still cut in enormous quantities, has given way to white spruce as the leading source of lumber.

Of the other eastern species, hemlock and red pine are valuable structural timbers. Jack pine is an important source of railway ties and the cheaper grades of lumber. It is also used to some extent for pulpwood and, as the supply of accessible spruce and balsam diminishes, its use for this purpose will increase.



IN THE FORESTS OF BRITISH COLUMBIA

White cedar, although heavily exploited in the past, is still a valuable shingle material. Of the hardwoods, yellow birch, hard or sugar maple, the source of the maple sugar and syrup of commerce, white elm and basswood are the most important, together with smaller quantities of ash, beech, oak, and several minor species. Poplar is abundant and, though at present used to only a limited extent, will doubtless become an important pulpwood species.

The forests of the Atlantic provinces are similar in nature to those of the St. Lawrence basin, with the addition of the red spruce.

Lumbering

The lumbering industry has long been established on an extensive scale. The statistics of early days are not always comparable to those collected in recent years, but it is quite certain that the industry has steadily increased in importance from the time of the first organized settlement. The largest recorded production of sawn lumber was that of 1911, with a cut of almost 5,000,000 M feet.

The annual output during the past fourteen years is shown in the following statement:

TABLE XXI.—ANNUAL PRODUCTION OF LUMBER, 1908 TO 1921, INCLUSIVE

Year	Quantity M ft. board measure	Value
1908.....	3,347,000	\$54,338,000
1909.....	3,815,000	62,820,000
1910.....	4,452,000	70,609,000
1911.....	4,918,000	75,831,000
1912.....	4,390,000	69,476,000
1913.....	3,817,000	65,796,000
1914.....	3,946,000	60,363,000
1915.....	3,843,000	61,920,000
1916.....	3,491,000	58,365,000
1917.....	4,152,000	83,655,000
1918.....	3,887,000	103 701 000
1919.....	3 820 000	122,031,000
1920.....	4,302,000	168,368,000
1921.....	2,869,000	82,449,000

The industry began with the early settlements in the lower St. Lawrence valley and the Atlantic Provinces. The later periods of more rapid advance in settlement saw the industry spread northward and westward. The Ottawa Valley became the centre of production, and the Georgian Bay district was later opened up. Although saw-mills are now operated throughout Eastern Canada, the Ottawa Valley and Georgian Bay districts are still leading lumbering regions. New Brunswick is also a very important lumber-producing province.

Lumbering in the northern parts of the Prairie Provinces has progressed with the colonization of those areas, but the production does not wholly meet the local demand.

Exploitation of the immense forests of British Columbia proceeded simultaneously with similar development in the Pacific States across the border, and is now steadily increasing. The cut of sawn lumber in British Columbia is now over a third of the total production for Canada, while in 1908 this province contributed less than one-fifth of the total. With the depletion of the supplies of saw-timber in the east, and the utilization of new areas hitherto commercially inaccessible in British Columbia, this province will eventually produce the bulk of Canada's lumber.

TABLE XXII.—PRODUCTION OF SAWN LUMBER, 1920,
BY PROVINCES*

Province	Quantity M ft. board measure	Value	Per cent of total quan- tity for Canada
		\$	
Nova Scotia.....	274,000	9,467,000	6.4
Prince Edward Island.....	6,200	244,000	0.1
New Brunswick.....	515,800	18,374,000	12.0
Quebec.....	916,400	37,128,000	21.3
Ontario.....	992,900	43,148,000	23.1
Manitoba.....	58,400	2,058,000	1.4
Saskatchewan.....	54,400	2,075,000	1.3
Alberta.....	41,200	1,480,000	0.9
British Columbia.....	1,443,300	54,394,000	33.5
Grand totals for Canada....	4,302,600	168,368,000	100.0

*The production returns for 1920 show very high values but are used in preference to those of 1921 when the amount of the lumber cut was entirely out of line with normal production.

In 1908 Canada had approximately 1,500 operating saw-mills. The number has increased and, even with the severe depression of 1921, reports of production were received from over 3,100 establishments. The foregoing table illustrates the degree of development attained by the industry in the various provinces.

TABLE XXIII.—PRODUCTION OF SAWN LUMBER, 1920, BY KINDS OF WOOD

Kinds of wood	Quantity M ft. board measure	Selling value at mills	Per cent of total quantity
Softwoods—		\$	
Spruce.....	1,490,100	56,090,000	34·6
Douglas fir.....	901,900	34,413,000	21·0
White pine.....	641,700	29,608,000	14·9
Hemlock.....	319,600	11,306,000	7·4
Cedar.....	197,000	7,170,000	4·6
Balsam fir.....	132,400	4,733,000	3·1
Other softwoods.....	365,000	14,098,000	8·5
Total, softwoods.....	4,047,700	157,418,000	94·1
Hardwoods—			
Birch.....	95,900	4,267,000	2·2
Maple.....	57,700	2,512,000	1·3
Basswood.....	29,400	1,259,000	0·7
Elm.....	30,500	1,266,000	0·7
Beech.....	8,500	330,000	0·2
Ash.....	10,200	422,000	0·2
Poplar (all kinds).....	15,500	564,000	0·4
Oak.....	4,700	223,000	0·1
Other hardwoods.....	2,500	107,000	0·1
Total, hardwoods.....	254,900	10,950,000	5·9
Grand total, hard and soft woods	4,302,600	168,368,000	100·0

The production returns for the year 1920 also indicate the relative importance of the different species which contribute the major portion of the total output. In addition to the cut of the

principal species, as shown above, there is a substantial output of jack pine, western yellow pine, tamarack, and, among the hardwoods, hickory, chestnut, cherry, butternut and walnut.

THE LUMBER TRADE

Lumbering in Canada has had a long career as an exporting industry. In 1667, during the French regime, timber was first shipped to Europe from territory now included in the Dominion. The export to England became important in the early years of the nineteenth century. In 1864, when the square and waney timber trade reached its maximum, as many as 1,350 sailing vessels entered the port of Quebec, and carried away over 20,000,000 cubic feet of timber, almost all of which was white or Quebec pine. At the time of Confederation forest products constituted the most valuable class of exports from the new Dominion.

Today, with more than 3,100 saw-mills in operation, lumbering has assumed huge proportions. Its prosperity, in common with that of so many of the Dominion's other basic industries, depends very largely upon export sales. In normal years the value of the lumber sold abroad amounts to considerably more than one-half of the total value of the lumber output. Most of the great producing centres are favourably situated

with regard to water transportation facilities—the forests of British Columbia and New Brunswick contiguous to the Pacific and Atlantic seabords respectively, and those of Quebec and Ontario convenient to the Great Lakes or to the Ottawa and the St. Lawrence River systems.

The United States furnishes the chief market for Canadian lumber, taking more than all other customers combined. The United Kingdom is also a heavy buyer. Beyond these two chief markets Canada's exports of unmanufactured wood receive in smaller volumes practically world-wide distribution, entering continental Europe, Oceania and the Orient, Africa, the East and West Indies, and South and Central America. Planks and boards of spruce, pine and fir account for the bulk of the export trade. Shingles are an important item, and the remaining exports include lath, railway ties, poles, pickets, piling and numerous other products.

Canada's external trade in lumber is mainly but not wholly an exporting business. While the imports are small in comparison with exports, they include quite a wide range of woods. Oak, gumwood, cherry, chestnut, hickory, mahogany, walnut and pitch pine are some of the more important items in the total of lumber and timber imports, but their aggregate value is much less than that of the exports of spruce alone.

Pulp and Paper Industry

The pulp and paper industry in Canada has increased enormously in late years. Its growth has been the most conspicuous feature of recent industrial progress in Eastern Canada and, to a very great extent, has been achieved within the past decade. The Pacific coast province of British Columbia, as well as the Eastern provinces, has shared largely in the expansion of this industry. Since 1911, when 54 firms reported the manufacture of about 500,000 tons of pulp, the output has mounted rapidly until, in 1922, 71 mills were engaged in the manufacture of over 2,150,000 tons of pulp. Of these mills 28 were also engaged in the manufacture of paper, and another 33 mills produced paper exclusively. The yearly output of newsprint paper alone is expected to reach 1,500,000 tons by 1924. The record monthly output so far achieved was that of May, 1923, when the production of newsprint reached 110,000 tons.

The capital invested in pulp and paper mills in 1922 exceeded \$381,000,000; over 25,000 people were employed, and the value of the output was \$85,000,000 for pulp and \$106,000,000 for paper. The volume of the raw forest materials required to support this industry is evidenced by the table showing the consumption of pulpwood in Canadian mills for the calendar year 1921. Spruce

supplies about two-thirds of the total requirements and balsam fir roughly one-quarter. Hemlock is the other chief source, while white poplar, jack pine and other woods are used in minor quantities.

TABLE XXIV.—CONSUMPTION OF PULPWOOD DURING
CALENDAR YEAR 1921, BY PROVINCES

Province	Quantity	Per cent of total	Value delivered at mills
	cords		\$
Quebec.....	1,111,277	51	19,657,000
Ontario.....	700,589	32	13,378,000
British Columbia.....	225,240	10	3,482,000
New Brunswick.....	121,110	6	1,519,000
Nova Scotia.....	22,362	1	247,000
Total.....	2,180,578	100	38,283,000

Canada imports no pulpwood, but a considerable quantity is cut for export to the United States. Table XXV shows the total cut for purposes of both domestic consumption and export during the period from 1908 to 1922. While it is evident that the rapid increase in the cut has imposed an enormous burden upon Canadian pulpwood forests, it is nevertheless true that the attraction of forest exploitation on such a large scale has been a stroke of unqualified good fortune. As wheat transformed the prairie expanses of Western Canada into a great national asset, so pulp and paper have diffused commercial value over immense areas of



A RIVER OF LOGS, NEW BRUNSWICK

Eastern Canada and British Columbia which had not only awaited development for many years but had in the meantime suffered severely from the ravages of forest fires.

TABLE XXV—TOTAL QUANTITY OF PULPWOOD PRODUCED IN CANADA FOR HOME CONSUMPTION AND EXPORT

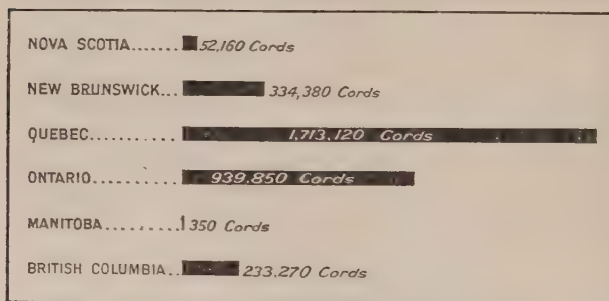
Year	Quantity, in cords	Value
1908.....	1,325,000	\$ 7,732,000
1909.....	1,557,000	9,316,000
1910.....	1,541,000	9,795,000
1911.....	1,520,000	9,678,000
1912.....	1,846,000	11,911,000
1913.....	2,144,000	14,313,000
1914.....	2,196,000	14,770,000
1915.....	2,355,000	15,590,000
1916.....	2,833,000	19,971,000
1917.....	3,122,000	26,739,000
1918.....	3,560,000	37,886,000
1919.....	3,498,000	41,941,000
1920.....	4,024,000	61,183,000
1921.....	3,273,000	52,900,000
1922.....	3,924,000	50,735,000

DISTRIBUTION OF THE INDUSTRY

The pulp and paper industry, as well as lumbering, had its beginning in Quebec. That province still cuts for export and for home consumption more than 50 per cent of the pulpwood produced in Canada. The industry spread into Ontario, chiefly the Niagara peninsula, which is still an important pulp-producing centre. Mills have since been very widely established throughout the province, especially in the Ottawa valley and Northern Ontario.

No development has taken place as yet in the Prairie Provinces, with the exception of the exportation of unimportant quantities of raw pulpwood. Spruce, balsam fir, jack pine and poplar are found abundantly throughout this region and are valuable pulpwood species. Important development, however, is now under way in the area tributary to Lake Winnipeg.

TOTAL PRODUCTION OF PULPWOOD BY PROVINCES, 1921



The rise of the industry on the Pacific coast has been almost phenomenal. In 1908 two mills were under construction, but prior to 1911 the province produced less than 1,000 tons of pulp per annum. In 1912 the production rose to 25,000 tons, and in 1921 the output of the seven mills operating in British Columbia exceeded 165,000 tons. The industry in this province has until recently been confined to tide-water, although

enormous resources of spruce, hemlock, alpine fir and lodgepole pine pulpwood are found in the interior. Several projects are under way for the establishment of pulp and paper mills to utilize this timber.

FOREIGN TRADE IN PULPWOOD, PULP AND PAPER

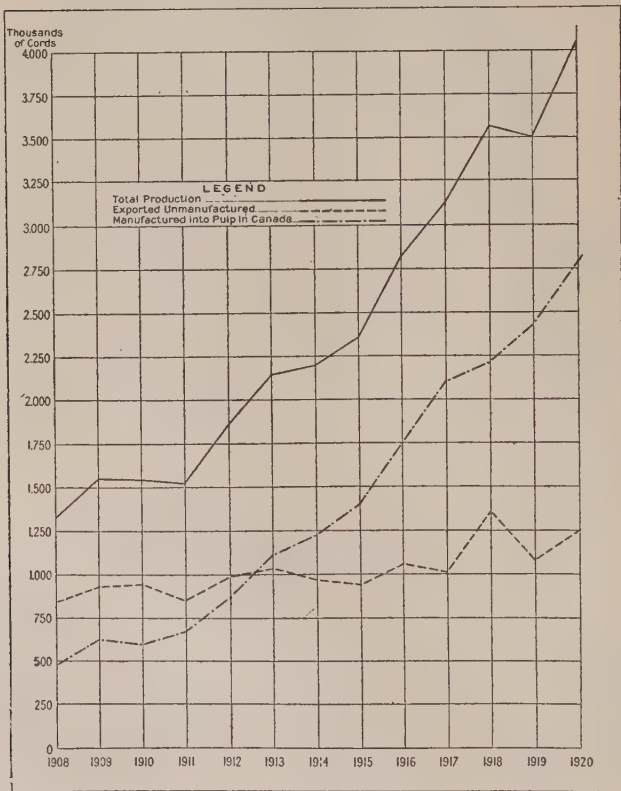
The remarkable growth of Canada's export trade in the products of the forest industries has been due mainly to pulpwood products rather than to those of saw-timber. The pulp and paper industry, in fact, has been built upon trade abroad, and owes its exceptional advance in large measure to the demands of the United States market with its huge consumption of newsprint and other paper. The record of recent years demonstrates the extent to which the pulp and paper industry has been responsible for the increase in Canada's total external trade.

TABLE XXVI—EXPORTS OF PULP AND PAPER, 1912-1922

Year	Paper products	Woodpulp	Total
1912.....	\$ 3,881,000	\$ 5,094,000	\$ 8,975,000
1913.....	6,786,000	5,510,000	12,296,000
1914.....	13,259,000	6,365,000	19,624,000
1915.....	16,004,000	9,266,000	25,270,000
1916.....	20,439,000	10,377,000	30,816,000
1917.....	26,072,000	20,404,000	46,476,000
1918.....	37,723,000	25,621,000	63,344,000
1919.....	47,863,000	34,707,000	82,570,000
1920.....	63,253,000	41,383,000	104,636,000
1921.....	92,103,000	71,551,000	163,654,000
1922.....	69,533,000	35,925,000	105,458,000

**PRODUCTION, MANUFACTURE AND EXPORT OF PULPWOOD
IN 1908-1920, FOR ALL CANADA**

(Showing the remarkable increase in the proportion of pulpwood
used in home manufacture)



The United States market absorbs approximately four-fifths of Canada's pulp and paper shipments. The remaining portion enters very numerous and widely distributed markets. Two-thirds of the newsprint paper consumed in the United States is either of Canadian manufacture or is made from wood or woodpulp imported from Canada. Since 1902 the exports of raw pulpwood have gone exclusively to the United States, and they amount annually to about 1,000,000 cords.

The exportation of raw pulpwood has remained practically constant since 1916, while the quantity consumed in domestic manufacture has increased since 1912 by over 300 per cent. The accompanying diagram shows graphically the pronounced increase in the proportion of pulpwood manufactured into pulp in Canada since 1908. The Dominion's splendid water-power resources have combined with the immense areas of pulpwood forests in affording a natural basis for the manufacturing as well as the primary phases of pulp and paper production.

RELATION OF FORESTS TO NATIONAL BUSINESS

While lumber and pulpwood are the chief forest products of Canada, there are numerous minor products of large value for home consumption as well as for export. Firewood, fence posts

and rails form an important part of the material produced for home consumption, likewise railway cross-ties, cooperage stock, telegraph and telephone poles, mining timber, tanning materials and other miscellaneous products. The total value of the annual output of forest products of all classes is in the neighbourhood of \$300,000,000.

TABLE XXVII.—EXTERNAL TRADE IN WOOD PRODUCTS AND PAPER, 1914-1923

Year	Exports of Canadian merchandise	Imports for consumption	Surplus of exports over imports
	\$	\$	\$
1914.....	63,202,000	37,397,000	25,805,000
1915.....	68,616,000	26,757,000	41,859,000
1916.....	83,116,000	18,277,000	64,839,000
1917.....	103,652,000	23,931,000	79,721,000
1918.....	116,385,000	28,471,000	87,914,000
1919.....	154,569,000	35,400,000	119,169,000
1920.....	213,914,000	43,183,000	170,731,000
1921.....	284,561,000	57,449,000	227,112,000
1922.....	179,926,000	35,791,000	144,135,000
1923.....	228,756,000	35,845,000	192,911,000
Total.....	1,496,697,000	342,501,000	1,154,196,000
Annual average for period.....	149,669,700	34,250,100	115,419,600

Perhaps a better conception of the tremendous importance of forest industries to the business life of Canada is gained from their contribution to the Dominion's external trade, rather than from the somewhat unsatisfactory estimates that can be made of their capital value or of the value of the

total annual production of lumber, shingles, pulp-wood and other commodities. During the past ten years Canada's foreign commerce in wood, wood products and paper—mainly the products of the forest in raw or finished form—have yielded a surplus in value of exports over that of imports amounting to over one thousand million dollars. The Dominion's daily sales abroad of this class of merchandise exceeded \$600,000 during the fiscal year ending March, 1923.

It is evident from the foregoing table that the industries based upon forest resources are a factor of enormous strength in maintaining the Dominion's commercial standing. Despite the present magnitude of the lumbering and pulp and paper industries, the forests of certain portions of Canada are undoubtedly capable of sustaining greater development, particularly in British Columbia. Nevertheless, bearing in mind the experience of other countries and the demonstrated rapidity with which the greatest timber resources may be depleted, the federal and provincial authorities are fully alive to the need for such forestry methods as will ensure the production, in perpetuity, of successive crops of timber from the vast areas of the Dominion which are chiefly valuable for that purpose.

CHAPTER V

Minerals and Mining*

THE importance of mineral resources in the economic structure of a nation has been vastly magnified in modern times, and has given rise to the axiom that coal and iron are the basis of industrial strength and progress. To coal and iron must now be added petroleum. In the possession of these three essentials of modern civilization, the continent of North America stands preëminent amongst the world's geographical areas. Canada, occupying the northern half of North America, shares in the possession of enormous resources of coal, in large resources of low grade iron ores which are already on the verge of successful commercial exploitation, and, it is confidently hoped, in great potential resources in oil.

*Chapter on Minerals and Mining prepared by the Mines Branch of the Department of Mines.

It is, however, in respect to other products that Canada has hitherto contributed most heavily to the world's markets. Long before the exceptional production stimulated by the war, the Dominion had become the world's principal source of nickel, asbestos and cobalt, and an important producer of gold, silver, copper, lead, zinc, and a number of the rarer metals. Few countries possess greater coal resources, and the Canadian output of arsenic, chromite, feldspar, graphite, gypsum, mica, magnesite, pyrites, and talc stands high in records of the world's production. The mining areas of Cariboo, Klondike, Rossland, Anyox, Britannia Bay, Salmon River, Alice Arm, Portland Canal, Sudbury, Cobalt, Porcupine, Kirkland Lake, and, more recently, the newer gold areas in Ontario and Quebec, and the copper-gold-silver camps in Northern Manitoba have become familiar in the world's mineral markets.

The discovery of each new mineral district has been followed by great stimulation in mining activity, which, supplemented by the more prosaic mining of coal, asbestos, gypsum, salt, and the numerous other non-metallic products, has resulted in rapid increase in the total annual value of Canada's mineral production during the past thirty years.

TABLE XXVIII.—ANNUAL VALUE OF MINERAL PRODUCTION

Year	Metallic	Non-metallic		Total	Value per capita
		Fuel and other non-metallics	Clay products and other structural materials, cement, lime, stone, etc.		
1890. .	\$ 3,610,000	\$ 9,140,000	\$ 3,760,000	\$16,760,000*	\$ 3.50
1900. .	40,520,000	17,230,000	6,370,000	64,420,000†	12.00
1910. .	49,440,000	37,760,000	19,630,000	106,820,000	14.64
1914. .	59,390,000	43,470,000	26,010,000	128,860,000	16.75
1918. .	114,550,000	77,620,000	19,130,000	211,300,000	25.37
1919. .	73,260,000	76,000,000	27,420,000	176,690,000	20.84
1920. .	77,940,000	108,030,000	41,890,000	227,860,000	26.40
1921. .	49,340,000	87,840,000	34,740,000	171,920,000	19.56
1922. ‡	61,150,000	83,180,000	39,300,000	183,630,000	20.89

*Includes \$250,000 credited to products not reported.

†Includes \$300,000 credited to products not reported.

‡Preliminary estimate Dominion Bureau of Statistics, Feb. 27, 1923.

The close of the war was naturally followed by a period of readjustment, involving semi-stagnation in the production of such metals as nickel, copper, lead and zinc, as well as in other minerals. The year 1920 showed a quick reaction to increased output, particularly of non-metallics and structural products, resulting in a total value of production greater than that of any previous year. This high level was not maintained, and a further depression in metal output, especially copper and nickel, with lower prices for silver, reduced the total value for 1921 to a figure below that of any of the previous five years. Gold, silver and lead outputs advanced decidedly during the past year and, while copper and nickel remained



BRITANNIA COPPER MINE AND CONCENTRATOR, BRITISH COLUMBIA

low, the mineral production for 1922 reached a total value surpassed only in two or three exceptional years. The details for the principal items in the output for 1922 indicate the diversity of Canada's mining development.

TABLE XXIX.—PRINCIPAL ITEMS OF MINERAL PRODUCTION, 1922*

Product	Quantity	Value	Per cent of total
Metallic—			
Gold.....Fine ozs.	1,230,985	\$ 25,446,717	13·86
Silver....."	17,611,646	11,891,560	6·47
Lead.....lbs.	94,170,469	6,789,690	3·70
Nickel....."	17,496,490	6,123,771	3·33
Copper....."	43,321,403	5,797,270	3·16
Zinc....."	56,397,500	3,223,681	1·76
Others.....		1,872,301	1·02
Total value of metallics.....		61,144,990	33·30
Non-metallic—			
Coal.....tons	15,045,286	66,486,025	36·20
Natural gas.....M cu.ft.	14,954,097	5,468,963	2·98
Asbestos.....tons	158,198	5,264,650	2·87
Gypsum....."	441,159	2,043,145	1·11
Salt....."	177,193	1,646,666	0·90
Others.....		2,273,434	1·24
Total value of non-metallics.....		83,182,883	45·30
Structural materials, etc.—			
Cement.....bbls..	6,943,968	15,438,467	8·41
Clay products.....		10,453,865	5·69
Lime.....bush.	8,065,304	3,181,115	1·73
Stone.....tons.	4,236,637	7,607,495	4·14
Sand and gravel....."	11,574,862	2,624,324	1·43
Total value of structural materials, etc.....		39,302,266	21·40
Grand total.....		183,630,139	100·00

*Preliminary estimate, Dominion Bureau of Statistics.

The value of the mining industry to the Dominion is reflected only in a very general manner by the monetary sum of the total output,

or by the variety of mineral products. Perhaps the best indication of its importance as a national asset and as a source of economic strength is furnished by the fact that the mining industry is credited with over 35 per cent of the total tonnage carried by Canadian railways. It is significant to note also that, as a result of the wide distribution of mineral resources, five of the nine provinces of the Dominion share substantially in mining activity, although Ontario leads her sister provinces by a considerable margin.

TABLE XXX.—MINERAL PRODUCTION BY PROVINCES, 1922

Province	Value of production	Per cent of total
Nova Scotia.....	\$ 28,804,474	15·69
New Brunswick.....	2,414,152	1·31
Quebec.....	17,400,232	9·48
Ontario.....	65,370,366	35·60
Manitoba.....	2,118,529	1·15
Saskatchewan.....	827,645	0·45
Alberta.....	25,717,572	14·00
British Columbia.....	39,166,614	21·33
Yukon.....	1,810,555	0·99
Total.....	183,630,139	100·0

DISTRIBUTION OF MINERALS

Eastern Canada.—Important deposits of coal, iron, gold and gypsum are mined or quarried in the Atlantic coast province of Nova Scotia. There

is a considerable production of clay products, limestone for furnace flux, and sandstone for building purposes and for grindstones. Granite and manganese, antimony, tripolite, barite and salt are also mined, while some attention has been paid to copper and lead ores.

The most important mining development in Nova Scotia is in coal, and upon this is based the large iron and steel industries of Sydney and New Glasgow. The iron ores are brought from the Wabana mines in Newfoundland. The close association here of one of the largest iron ore deposits in the world with enormous coal resources and necessary fluxes, all conveniently situated on the Atlantic seaboard, may well become in future a controlling factor in a large portion of the world's iron and steel trade.

*TABLE XXXI—MINERAL PRODUCTION OF NOVA SCOTIA, 1920

	Quantity	Value
		\$
Coal, tons.....	6,429,291	32,238,129
Gypsum, tons.....	260,661	573,752
Clay products.....	.....	541,114
Stone.....	.....	420,175
Other products.....	.....	356,847
Total.....	.....	34,130,017

*To illustrate the diversity of mineral output in the various provinces the statistics for 1920 are used in preference to those for 1921, as the latter cover a period of depression in certain branches of the mining industry.

Mineral development in New Brunswick is less prominent. This is partly due to the covering of soil and to the forested areas which make prospecting difficult. The principal mineral products are iron, gypsum, natural gas, lime, coal, building material, grindstones, clays and mineral water. Antimony, manganese and albertite have been important, while copper, lead, silver, nickel, gold and other minerals have been found. Shales rich in oils and ammonium salts occur in large quantity.

Ontario and Quebec.—The main asbestos mines of the world are found in the southeastern portion of Quebec, and other important industries are carried on in chrome iron ore, copper, pyrites and the quarrying of granite. Iron ores and gold also occur.

TABLE XXXII—MINERAL PRODUCTION OF QUEBEC, 1920

	Quantity	Value
		\$
Asbestos and asbestic..... tons	199,573	14,792,201
Cement..... brls.	3,013,463	6,545,054
Clay products.....		2,361,007
Stone.....		2,189,325
Lime..... bush.	2,108,203	826,044
Magnesite..... tons	18,378	512,756
Mica..... "		281,460
Other products.....		1,378,367
Total.....		28,886,214

Within the past year prospecting for gold has been very active in Rouyn township and adjoining area in Timiskaming county, north-western Quebec. Important discoveries have been made and their encouraging nature has led to the staking of many thousands of acres of mining land. The geology of the area is somewhat similar to that of the well-known Kirkland Lake district.

The southern portion of Ontario and the valley of the St. Lawrence, designated as the St. Lawrence Lowlands, are covered mainly by flat-lying Palaeozoic rocks. The mineral products include clay, cement, slate, lime, limestone and sandstone, petroleum, natural gas, salt, gypsum and other non-metallic products.

MINERAL WEALTH OF HUGE LAURENTIAN PLATEAU

The country extending from Labrador on the east, enclosing the Hudson Bay basin, and referred to as the Laurentian Plateau region, consists of a huge U-shaped area of pre-Cambrian rocks, estimated to cover 2,000,000 square miles, or over one-half of Canada. This region occupies nearly all but the most southern portions of the provinces of Quebec, Ontario and Manitoba.

The rocks of the pre-Cambrian are remarkable for the variety of their useful and valuable mineral deposits. Iron, copper, nickel, cobalt, silver, gold,

platinum and palladium, molybdenum, lead, zinc, arsenic, pyrites, mica, apatite, graphite, feldspar, fluorspar, quartz, talc, actinolite, the rare earths, ornamental stones and gems, building materials, etc., are all found, and are, or have been, profitably mined. Most of the other materials—both common and rare—that are used in the arts, have been found.

TABLE XXXIII—MINERAL PRODUCTION OF ONTARIO, 1920

	Quantity	Value
Nickel..... lbs.	61,335,706	\$24,534,282
Gold..... ozs.	564,995	11,679,483
Silver..... "	9,907,626	9,996,795
Clay products.....		5,613,488
Copper..... lbs.	32,059,993	5,596,392
Cement..... brls.	2,035,594	4,377,814
Stone.....		4,035,478
Natural gas..... M cu. ft.	10,529,374	2,920,731
Iron, pig, from Canadian ore..... tons	75,869	2,066,997
Lime..... bush.	5,109,635	1,962,086
Salt..... tons	206,832	1,512,724
Cobalt, metallic, and in oxide, etc.. lbs.	546,023	1,365,058
Petroleum..... brls.	180,071	726,286
Pyrites..... tons	148,652	618,283
Other products.....		4,709,911
Total.....		\$81,715,808

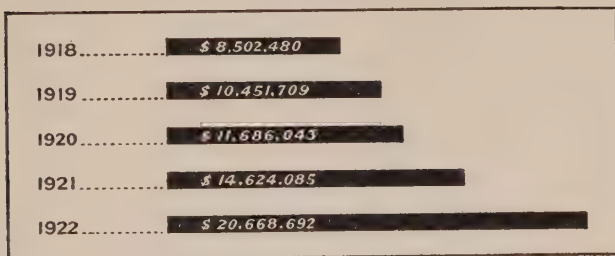
The mineral output of the province of Ontario is unusually diversified. Along the southern edge of the Laurentian Plateau region in Canada there are the known gold ranges of the Lake of the Woods, the silver of Thunder Bay, a succession of iron ranges extending from Minnesota for hundreds of miles to Quebec, copper rocks of Michipicoten and Bruce mines; the Sudbury copper-nickel deposits; the Montreal River and Cobalt silver areas; the Porcu-



MINE PLANT IN ONTARIO GOLD FIELDS

pine, Larder Lake and Kirkland Lake gold fields; the corundum deposits of eastern Ontario; the magnetites of eastern Ontario and Quebec, and their large apatite-mica deposits.

GOLD PRODUCTION OF NORTHERN ONTARIO, 1918-1922



In recent years the outstanding feature of the Ontario mineral industry has been the rapid increase in gold production. Gold mining in Ontario has extended over half a century but has made its chief progress since 1911, owing particularly to the Porcupine and, to a less extent, to the Kirkland Lake areas. The output for 1922 reached approximately one million ounces, valued in excess of \$20,000,000. There is ample evidence that Ontario's gold production will probably double in the next few years and, added to the production of silver, nickel, copper and numerous other minerals which have been mined extensively for many years, will give the province a very high rank among the world's principal mineral producing areas.

Manitoba and Saskatchewan. The western end of the pre-Cambrian region extends across the northern portion of Manitoba and Saskatchewan. Prospecting in these provinces has already been rewarded by important discoveries. Numerous claims have been staked for gold, and several mines are under development, but the most important discoveries have been the copper-zinc sulphide deposits at Flin-Flon lake and Schist lake. The Mandy mine at Schist lake has already shipped a considerable tonnage of high grade copper ore, and the Flin-Flon property has been extensively drilled, proving an ore body of about 16,000,000 tons. With transportation and smelting facilities provided, a large mineral area may be actively developed, but as yet Manitoba and Saskatchewan do not possess extensive mining activity.

It is a safe assumption that this great northern area, still almost entirely unexplored and but slightly prospected, contains vast stores of mineral wealth which will become available as the country is opened up.

The Interior Continental Plain. This area includes the greater portions of Manitoba and Saskatchewan which lie outside of the pre-Cambrian, and the province of Alberta. It is pre-eminently agricultural, but in addition to furnishing an important market for the product of the mine,

will have a large output of non-metallic minerals. It is underlain for the greater part by sedimentary rocks, chiefly of Cretaceous age, containing coal, building stones, clays and cement materials. The lignite of the more easterly plains, useful for local purposes, becomes more highly bituminous as the mountains are approached. The known coal reserves in Alberta are greater than in any other province, being estimated at 1,072,627 millions of metric tons. Natural gas occurs over wide areas, and there is every indication of the existence of oil fields. Intensive prospecting for oil is now being carried on by large Canadian and British corporations. Enormous deposits of tar sands have been found in northern Alberta, gold in a number of the rivers coming from the mountains, and clay ironstone occurrences in many parts of the North-west.

TABLE XXXIV—MINERAL PRODUCTION OF ALBERTA, 1920

	Quantity	Value
		\$
Coal..... tons	6,833,500	29,849,608
Natural gas..... M cu. ft.	5,633,442	1,181,345
Clay products.....	.....	786,430
Petroleum..... bris.	11,032	75,986
Other products.....	.....	1,693,087
Total.....	.....	33,586,456

Coal has been the principal product in Alberta and Saskatchewan, and natural gas has been extensively used for many years in the former province. Gypsum has long been quarried in Manitoba, and salt was also formerly recovered from brines. Drilling for salt is now in progress in Alberta. Natural deposits of sodium sulphate in Saskatchewan and Alberta are attracting considerable attention, and a beginning has been made in marketing the product. The white clays of southern Saskatchewan are being used for the manufacture of more or less refractory products, and will eventually be the basis of large ceramic industries.

British Columbia and the Yukon. The Cordilleran belt in South America, in Mexico and in the Western States, is recognized as one of the greatest mining regions of the world, noted principally for its wealth in gold, silver, copper and lead.

In Canada this belt has a length of 1,300 miles, a width of 400 miles, and its rocks range from the oldest formations to the youngest. It is not only rich in gold, silver, copper, lead and zinc, but has enormous resources of coal of excellent quality, varying from lignites to anthracite. Though mostly unprospected, it has already been proved to possess immense coal fields, several of the

greatest copper and silver-lead mines, one of the greatest zinc mines, and two of the greatest placer camps in western America.

The coal fields of the Crowsnest Pass district, and the coking ovens at Fernie and Michel, have supplied fuel for the smelting industries of southern British Columbia and of the adjacent states to the south. The Vancouver Island coal mines have supplied metallurgical fuel and domestic and steam coal for home consumption and for export.

TABLE XXXV—MINERAL PRODUCTION OF BRITISH COLUMBIA, 1920

	Quantity	Value
		\$
Coal..... tons	2,858,877	16,726,950
Copper..... lbs.	45,319,771	7,911,019
Silver..... ozs.	3,327,028	3,356,971
Zinc..... lbs.	38,729,762	2,970,960
Lead..... "	32,792,725	2,931,670
Gold..... ozs.	124,808	2,580,010
Clay products.....		596,172
Other products.....		2,337,976
Total.....		39,411,728

METAL MINING IN BRITISH COLUMBIA

The metalliferous ores of British Columbia are highly complex. Hitherto the production of silver-lead-zinc ores has predominated in the Kootenay districts, gold-copper ores at Rossland, low-grade copper ores in the "Boundary district," and copper

ores on the coast. In the Sullivan mine at Kimberley upwards of 6,000,000 tons of lead and zinc ore are claimed to have been developed, from which a large tonnage is shipped annually. At Trail a series of smelting and refining plants produce refined gold and silver, electrolytic lead, copper and zinc. The Rossland camp has had a varied history. Its ores are primarily gold ores, supplemented by a small copper content. Recent improvements in ore concentration methods and extensive ore development seem to ensure many years of further successful operation. At the Copper Mountain properties, near Princeton, a large mill has been erected, the concentrates being sent to Trail for smelting.

On the coast enormous bodies of copper ores have been developed at Britannia Bay and at Anyox. At the latter point a large smelting plant, in operation since 1914, is now producing upwards of 30,000,000 pounds of copper per annum. A complete by-product coking plant has been erected, the operating company having acquired its own coal areas on Vancouver Island. The new 2,500-ton mill at the Britannia Mine is treating 2,300 tons per day and will also produce at the rate of about 30,000,000 pounds of copper per year in the form of copper concentrates. Various properties on the coast give promise of large silver and

gold production, while iron ores have been found at different points on the coast and in the interior. The Salmon River-Portland Canal area has gained world wide fame following the success of the Premier gold-silver mine, which has paid dividends of \$3,650,000 up to April, 1923, after about three years' operations.

The Yukon district has held attention in the past chiefly because of its rich gold placers. Copper, silver and lead ores have been mined, however, and many other metals have been found. Coal has been found both in the southern and northern areas. At present attention is being centred on phenomenally rich silver-lead ores near Mayo.

The Northwest Territories are believed to possess great latent mineral resources. Those to which attention has already been directed include the native copper of the Coppermine River country, the iron ores of Belcher Island, gold and zinc near Great Slave lake and petroleum in the Mackenzie River basin below Fort Norman.

EXTERNAL TRADE IN MINERAL PRODUCTS

A very large portion of the mineral production of Canada is exported for consumption or refining outside of Canada. On the other hand, considerable quantities of mine products are

imported, chiefly those which have been refined or subjected to partial treatment, or in the form of manufactured goods ready for consumption. For economic or geographic reasons Canada is also a heavy importer of coal and iron. Sufficient domestic resources of petroleum have not yet been developed, and tin is obtained entirely from abroad.

The total values of exports and imports of mineral products, crude or refined, and of manufactured mine products is shown for a number of years in Table XXXVI. As these figures include manufactured goods they are not comparable to the mineral production records.

TABLE XXXVI.—EXTERNAL TRADE IN MINERAL PRODUCTS,
CRUDE AND REFINED, AND MANUFACTURED
MINE PRODUCTS, 1913-1921

Calendar year	Exports of Canadian merchandise	Imports for consumption	Excess of imports over exports
	\$	\$	\$
1913.....	79,804,000	259,300,000	179,496,000
1914.....	75,533,000	181,676,000	106,143,000
1915.....	124,158,000	146,465,000	22,307,000
1916.....	178,575,000	256,347,000	77,772,000
1917.....	187,894,000	355,928,000	168,034,000
1918.....	180,083,000	347,682,000	167,599,000
1919.....	179,958,000	330,711,000	150,753,000
1920.....	193,420,000	496,380,000	302,960,000
1921.....	92,357,000	303,522,000	211,165,000
Total, 1913-1921.....	1,291,782,000	2,678,011,000	1,386,229,000
Annual aver., 1913-1921	143,531,000	297,556,000	154,025,000

It will be observed that Canada figures much more prominently in foreign markets as a buyer than as a seller of commodities of mineral origin. On the interchange of such products the Dominion normally incurs a heavy adverse balance. Her mineral resources and industries support a large volume of export sales but several factors have combined to build up a much greater volume of purchases.

MINERAL IMPORTS

Canada's mineral purchases from abroad annually include a wide variety of products but the aggregate value is accounted for largely by three items—iron and steel goods, coal and petroleum. It is significant to note that, of the total mineral imports during 1920, amounting to over \$482,000,000, about \$250,000,000, or more than half, was contributed by iron and steel products, and over \$151,000,000, or approximately 31 per cent, by coal, coke and petroleum.

The size of Canada's annual bill for mineral imports does not merely reflect the fact that native resources of coal, iron ore and petroleum have for one reason or another fallen short of meeting domestic needs. There is the further fact that a large portion of the imports is taken in the form of highly manufactured products, such as

machinery, implements and automobiles. Thus the monetary sum of the Dominion's mineral purchases is perhaps due less to limitations in basic mineral resources and industries than to the necessarily moderate rate at which a young and sparsely settled country can strengthen its facilities for specialized manufacture.

MINERAL EXPORTS

Of the total exports in 1920 about \$60,000,000 can be attributed to metals, either in crude or refined metallic form or contained in ores or some form of metallurgical product exported for further refining. These include pig iron, ferro-alloys, steel billets and ingots, aluminium, cobalt, copper, lead, nickel, zinc, and gold and silver. About \$38,000,000 is attributed to asbestos, coal, mica, and various other non-metallic minerals, and approximately \$12,000,000 represents chemical products, such as cyanamide, calcium carbide, ammonium sulphate, etc. The balance of over \$83,000,000 is made up largely of manufactured products, chiefly manufactures of iron and steel, such as agricultural implements, machinery, boilers and locomotives, automobiles, steel rolling mill products, and wire.

FUTURE DEVELOPMENT

The future development of mineral industries will undoubtedly go hand in hand with the growth of population, the advance of settlement and the extension of transportation facilities. Their rate of progress promises to surpass that of the past quarter of a century. During that period both the metallurgical and chemical industries made great strides, but it was also true that mineral resources in Canada were forced to face severe competition. They had to offer exceptional promise in order to attract any great share of development funds and enterprise. Very strong inducements were being held out in other directions—by agricultural lands, pulpwood areas and water-powers, which have yielded good returns with relative freedom from the element of risk.

There is now every evidence that Canada has already entered upon a new period of development and that, in future, mineral resources will receive and generously reward a much greater share of attention than they formerly enjoyed. Such a course of industrial growth will be strictly in accord with the economic needs of the Dominion and with the unanimous belief in the nature and wealth of its hidden physical resources.

CHAPTER VI

Water-Power Resources and Development*

THE industrial structure of Canada rests in uncommon degree upon the utilization of water-power, and the extension of the water-power industry has been notable with regard to both the rate of development and the diversity of the field which it serves. The actual extent of Canada's water-powers, as of its forests and other natural resources, has been by no means fully ascertained, but they are known to be abundant and well distributed throughout the Dominion, except in the southern portion of Alberta and Saskatchewan.

It is an important and extremely fortunate fact that a large amount of the accessible water-power is situated in the "acute fuel zone," a territory stretching for about 1,000 miles east and west and centering upon the Great Lakes, where native coal is not conveniently or economically available.

*Chapter on Water-powers prepared by Dominion Water Power Branch, Department of Interior.

The latest survey or analysis of Canada's hydraulic resources, conservatively worked out from all available information on a basis of 80 per cent installed efficiency and a full working load for 24 hours per day, has placed the aggregate at 18,255,000 horse-power for conditions of ordinary minimum river flow. It is further estimated on the same basis that some 32,076,000 horse-power could be depended upon for six months of the year. The latter figure could probably be increased by about 30 per cent in actual development, as it is standard practice to install turbines in excess of the theoretical six-month power by about that amount.

The distribution of water-powers by provinces is shown in the accompanying table.

TABLE XXXVII.—AVAILABLE AND DEVELOPED WATER-POWER IN CANADA

(Available 24-horse power at 80% efficiency)

Province	At ordinary minimum flow	Dependable for six months	Turbine installation
	horse-power	horse-power	horse-power
Nova Scotia.....	20,751	128,264	47,100
Prince Edward Island. .	3,000	5,270	2,239
New Brunswick.....	50,406	120,807	42,039
Quebec.....	6,915,244	11,640,052	1,073,883
Ontario.....	4,950,300	6,808,190	1,299,200
Manitoba.....	3,270,491	5,769,444	134,025
Saskatchewan.....	513,481	1,087,756	.....
Alberta.....	475,281	1,137,505	33,067
British Columbia.....	1,931,142	5,103,460	328,977
Yukon and Northwest Territories.....	125,220	275,250	13,199
	18,255,316	32,075,998	2,973,759

In this connection it should be pointed out that storage facilities for the regulation of stream flow permit of great improvement in the status of most rivers with respect to power. For magnitude, continuity and distribution few countries can even approach Canada's unique system of fresh water bodies, and their employment in the regulation and control of her waterways is a singular benefit not only in power production but for navigation, irrigation, and other purposes of water supply. Illustrative of this is the situation in the maritime provinces of Nova Scotia and New Brunswick, where recent detailed analyses have disclosed most advantageous reservoir facilities for regulating stream flow, it being estimated, as a result of these investigations, that the two provinces possess within their respective borders 300,000 and 200,000 "commercial" horse-power.

GREAT POWER RIVERS

There are several outstanding power rivers in Canada which, with their tributaries, form important zones for settlement and industrial expansion. Foremost amongst these is the St. Lawrence river, not only because of its enormous discharge but also due to the almost complete natural storage of the Great Lakes which feed it

This great river is capable of furnishing over 3,500,000 horse-power, of which less than 1,500,000 horse-power is in the international reach and would have to be apportioned between Canada and the United States.

Of the many large rivers flowing into the St. Lawrence from the northern Laurentian plateau three should be mentioned, the Saguenay, the St. Maurice and the Ottawa, the latter being for most of its length an interprovincial waterway lying between Quebec and Ontario. All three rivers have fostered great lumber and pulp interests in their valleys, but latterly a broadening field of application to more general commercial and public undertakings has been evident. Regulated flow in the St. Maurice and Saguenay rivers would give each over 500,000 24-hour horse-power still available for development and convenient to tide-water. On the Ottawa river development has been confined to less than 100,000 horse-power in the vicinity of Ottawa city, leaving still unutilized 21 sites, aggregating 678,000 horse-power, on a basis of ordinary minimum flow, and probably twice that amount with adequate storage. It is from the headwater tributaries of the Ottawa that the silver mines of Northern Ontario draw their main supplies of electrical and compressed air energy. Many other rivers from the north

enter the St. Lawrence river and gulf and, while surveys have not been initiated on all, a number of sites are known to offer large power possibilities.

The spectacular fall and rapids of the Niagara river represent 5,300,000 horse-power with the whole flow of the river, of which 740,000 horse-power is now being employed on the Ontario side alone. Electricity from this source is distributed throughout the peninsula of southwestern Ontario and has led to the building up of several highly industrial centres.

The Georgian Bay and Lake Superior coastline is pierced by numerous streams well distributed and capable of furnishing power in limited quantities but sufficient for the probable future needs of these localities. A few plants have already been constructed and are now in operation in response to local requirements. The ordinary minimum flow of the rivers draining into James bay would furnish nearly 1,000,000 horse-power and about twice that amount for six months of the year.

The Winnipeg river, flowing from Lake of the Woods to lake Winnipeg, has played an important part in the history of Manitoba, formerly as a trade route to the west and now as a source of electrical energy for the City of Winnipeg and vicinity. Its present regulated flow gives it a

potential equivalent of nearly 500,000 horse-power, of which approximately 13 per cent is now harnessed. The Nelson river, rising in lake Winnipeg (9,400 square miles) and draining an immense territory of 440,000 square miles, with an outlet on Hudson bay, is an even more imposing waterway with almost 2,500,000 horse-power available at ordinary minimum flow and as yet undeveloped. While it is remote from present centres of population its proximity to the Hudson Bay railway makes it accessible. This would appear to invite investigation as a field favourable to the introduction of special industries, such as electro-chemical, electro-metallurgical and possibly pulp and paper enterprises. There are several excellent powers in the rivers of Northern Saskatchewan and Alberta which will prove invaluable for the development of the mineral and timber resources of that region.

The varying topography of British Columbia gives a wide distribution to that province's hydraulic assets. Owing to the extremely high heads often existent some of the small streams form important sources of power. It has been estimated that within a radius of 100 miles of Vancouver there is to be found nearly 1,000,000 horse-power dependable for six months of the year, excluding the many considerable sites on Vancouver island.

GROWTH AND STATUS

Of the country's water-power assets only a small portion, about seven per cent of an estimated total possible turbine installation, has been utilized as yet. Small as is the beginning, it represents a striking rate of growth. Dating from 1900, when the total installed horse-power was some 150,000 in scattered plants and mills, development has been swift and unfluctuating, even in times of trade depression. Today Canada possesses 2,973,000 operating horse-power and over 21,000 miles of transmission and distribution systems, located from Nova Scotia to the Yukon, in units varying from a few horse-power to the 55,000-h.p. turbines in use on the Niagara. Of the existing development, 2,204,000 h.p. (of which 648,000 h.p. is municipally or publicly owned) is operated by central stations, *i.e.*, plants selling power; 484,000 h.p. owned by pulp and paper companies; and 285,000 h.p. installed in other industries.

The total hydraulic installation for the Dominion averages 338 h.p. per thousand population, as compared with about 100 h.p. per thousand population in the United States. This figure places Canada second only to Norway in the per capita utilization of water-power. Should the rate of growth be maintained, and the indications are that it will be accelerated rather than retarded



A QUEBEC POWER, PULP AND PAPER PLANT

the total installation will have reached 3,360,000 h.p. by 1925, 4,110,000 h.p. by 1930, and 4,860,000 h.p. by 1935. Despite the tranquil condition of industry in general, 1921 and 1922 were years of marked advance in hydraulic enterprise. Some 500,000 horse-power was installed during the two years, with additional construction in progress.

Hydro-electric generation is one of the greatest of Canada's basic industries, while as a manufacturing process it is the largest in the Dominion from the standpoint of capitalization. The capital investment at the end of 1922 aggregated \$620,000,000, of which a large portion can be assigned to transmitting and distributing equipment. This figure does not include such industries as electric railways and plants for the production of electrical equipment, which in Canada are to a very large extent directly dependent on water-power for their existence.

SERVES BROAD INDUSTRIAL FIELD

Canadian water-power securities are highly favoured in the domestic and foreign financial markets because of their earning power and stability, but the economic value of hydro-electric enterprises is not so greatly due to high dividend return and security as to their essential importance to other industries. The effect of water-power

installation on manufactures and employment in Canada is indicated by the fact that while the urban population since 1900 has slightly more than doubled, the capital invested in manufactures and the annual value of manufactured products have increased something like 600 per cent during the same period, in which interval the installation of 2,800,000 h.p. (water-power) was completed. The increase in dollar values may be exaggerated by inflated conditions in war and post-war markets as they exist, but, allowing liberally for that factor, the result is still remarkable and clearly indicative that water-power development and industry must go hand in hand so far as Canada is concerned. population being relatively inconsiderable and wages and living standards relatively high.

The success of many typical Canadian industries, and the future of many projects now under way or under consideration, are vitally associated with cheap power facilities. This applies notably to the pulp and paper industry, the mining industry, the electro-chemical and electro-metallurgical industry, and the flour-milling industry. While the progress of Canadian industry as a whole has been in great part due to cheaply available hydro-power in ample quantities, the aforementioned industries have attained particular eminence as

contributors to the world supply of their respective products, largely or wholly by virtue of this advantageous factor.

The influence of water-power resources upon national development is exceptionally well illustrated by the pulp and paper industry. In 1890 Canada exported \$120 worth of pulp and paper, whereas at present the annual export value of these products is well over \$100,000,000. The paramount importance of cheap power as a factor in this growth may be judged from the fact that it takes practically 100 h.p. to make one ton of paper per day. The motive power used in the industry is virtually restricted to hydraulic energy, and Canada's prestige in this field of industrial activity rests on abundant water-powers strategically situated among extensive forest areas. A total of 645,000 hydraulic horse-power is used by the pulp and paper companies. Of this total 484,000 h.p. is developed by the industry itself and the remainder acquired by purchase.

Similarly, though perhaps in less striking fashion, water-power has stimulated and supported mining. Canadian gold, silver, nickel, and other mineralized properties have yielded very substantial outputs and in many cases large scale operations, which alone made the difference between profit and loss, would have been impossible

without ample hydraulic energy at relatively low cost. Many mines are so placed geographically that the cost of rail haul on coal or untreated ore would be prohibitive but, with hydraulic installations at or near the mines, they can be worked and the product so concentrated as to permit profitable operations. Extensive electro-chemical and electro-metallurgical industries have been established in Canada through the attraction of exceptional power advantages, nearly 100,000 h.p. being used, and it is expected that the near future will see further substantial progress in these directions. Among such products commercially produced in Canada and using hydraulic energy in their manufacture are aluminium, phosphorus, carbide, carborundum, cyanamide, caustic soda, chlorine, artificial graphite, etc. The successful application of the electric furnace to Canada's iron and possibly copper ores may ultimately prove the basis of a new industrial development of more than ordinary proportions.

RELATION TO AGRICULTURE AND TRANSPORTATION

Through the agency of electrically transmitted energy the Dominion's water-powers promise to exert a marked influence upon the conditions of rural life and the course of future agricultural development. Large industrial centres in the

various cheap power zones, notably in the lower St. Lawrence valley, the Ottawa valley, the Niagara peninsula, Central Manitoba and South-western British Columbia, are the nuclei of convenient and highly profitable home markets for agricultural produce, the importance of which is only beginning to be felt and appreciated. In addition, electrical energy is gradually being made available for the farmer himself for domestic and light power purposes. The Hydro-Electric Power Commission of Ontario, distributing hydro-electric power over a very broad field, is giving every encouragement to the use of electricity in rural districts. Its valuable example will doubtless be followed as soon as conditions permit by public and private enterprise elsewhere, and electric facilities should in due course become a prominent and regular feature of Canadian rural life.

The relation of water-powers to transportation in the past has been indirect but of substantial benefit. They have permitted the development of industry in areas which otherwise could not have contributed appreciable revenue to the railway systems. Today a more definite relationship is being proposed in the electrification of railways. There are many indications that the time is not far distant when water-power will replace coal, in part, at least, on Canadian railways.

REDUCES COAL HANDICAP

Aside from their effect upon specific industries, such as pulp and paper manufacturing, mining and others, water-powers have been of inestimable value in minimizing the severe industrial handicap imposed by the lack of coal deposits in the Dominion's most populous provinces. Ontario and Quebec, the two provinces most heavily handicapped in respect to coal, are very liberally endowed with water-power. While the Dominion as a whole is compelled to import large quantities of coal each year, the degree to which water-powers have relieved the situation is indicated by the fact that present water-power development represents an annual equivalent of nearly 27,000,000 tons of coal. The imports of coal are to a certain extent further offset by Canada's exports of hydro-electric power. Canadian power is sold to the United States at present by exporting companies variously located in the provinces of New Brunswick, Quebec, Ontario and British Columbia. The amounts of power exported for the fiscal years ending March 31, 1919, 1920 and 1921, were 175,013 h.p.-years, 143,003 h.p.-years, and 156,017 h.p.-years, respectively. This may be taken as offsetting approximately 1,500,000 tons of the coal imported annually from the United States.

COSTS AND REVENUES

Owing to the unusual degree of Canada's dependence upon water-powers, the matter of construction costs and revenue from water-power installations bears a vital relation to general industrial progress. An investigation covering 70 representative power plants throughout the Dominion, with an aggregate turbine installation of 745,797 h.p., revealed that, omitting real estate, transmission and distribution equipment, the total construction cost was \$51,530,000, or \$69.11 per horse-power installed. This figure represented the average capital cost of construction at the power site for moderately large plants constructed under market and labour conditions considerably easier than those of today. Increased costs are general in almost all industry, so that costs of development, while less strikingly so, are relatively as favourable now as formerly.

The \$620,000,000 invested in hydro-electric production represents the actual power and auxiliary power plants, transmission and distribution systems, together with their necessary equipment and real estate. Applied to the existing installation this capital investment amounts to \$209 per horse-power on an average, made up of \$239 per horse-power for central stations and \$127 per horse-power for industrial developments. The

difference, \$112 per horse-power, gives some indication of the outlay for transmitting and distributing power for sale.

Revenues and costs of production over the whole field are difficult to determine, as many plants do not sell power or keep separate accounts for their hydraulic operations. For the numerous large industrial companies which have their own hydro plants, in many cases the generating costs are extremely reasonable, power having been produced under favourable conditions for from \$9 to \$15 per h.p. per year by plants constructed at pre-war costs. The latter figure, \$15 per h.p.-year, may be accepted as a moderate estimate for the annual value of product per installed horse-power for all plants other than central stations. With respect to central stations, while it is possible in many localities to purchase blocks of power from such stations at rates approximating fifteen dollars, the average revenue of central stations from all sources is considerably higher, as shown by the census of industry for 1920. From the census figures it may be deduced that the average revenue is \$32.50 per installed horse-power (not per horse-power-year). The difference between \$15 and \$32.50 represents profits and the relatively heavy charge necessary for distribution to a large number of small customers.

Applying these figures, \$32.50 for central stations and \$15 (assumed) for private stations per installed horse-power, the total value of water-power production for 1920 was \$67,500,000 and pro rata for the present installations over \$83,000-000. These figures may seem small compared with the annual value of some other basic Canadian products and considering the high capital outlay, but it is, as a matter of fact, this low valuation in terms of dollars that makes the product of particular importance as a natural resource to which Canadian industry has responded with such magnificent growth and aptitude in recent years.

ADMINISTRATION

In the provinces of Manitoba, Saskatchewan and Alberta, and in the Northwest Territories, including the Yukon, water-powers are under the administrative control of the Dominion government. In the other provinces the provincial governments exercise jurisdiction. At one time the general policy throughout Canada permitted water-power sites to be acquired by purchase, but the present prevailing method of acquiring important sites is by lease. In the provinces of Nova Scotia, New Brunswick, Ontario and Manitoba, Hydro-Electric Power Commissions have been created by the respective governments to operate

power plants and transmission systems as publicly owned utilities. The Quebec government has not entered the development and transmission field, but has confined its efforts to the construction of large storage reservoirs. These have proved a great boon to power interests, and, as a charge is made to the companies benefited for the increased flow secured, these enterprises have also proved profitable to the province. Investigatory work in the various watersheds throughout the country is carried on by the Federal government working in close co-operation with provincial governments and commissions, and very complete information on all matters affecting water-power is made available.

Finally, it may be said that Canada has very great water-power resources and has already made gratifying progress in their development. Unexcelled electrical facilities have been provided for the general public as well as ample motive power for industry. Further, the resources as yet untouched will fully provide for the country's requirements for many years to come, and the methods of investigation and control exercised by the Federal and provincial governments guarantee that they will be developed efficiently and in the public interest.

CHAPTER VII

Commercial Fisheries

CANADA is singularly well endowed with fisheries resources. In the older fishing areas they have yielded an abundant and varied return over a much lengthier commercial history than can be claimed by Canadian agriculture, mining, lumbering, or even by the long renowned fur trade. The fishing banks off the Atlantic coast of the Dominion were attracting European fishermen centuries before the birth of either Canada or the United States.

Not only on the Atlantic but also on the Pacific coast and in her fresh water areas Canada possesses fisheries of exceptional value. While they do not rival the agricultural, forest or mineral resources in their contribution to the monetary sum of primary production, they form, nevertheless, a national asset of the first order. The annual yield, which in 1918 reached the record value of

\$60,000,000, places Canada third among the fishing countries of the world, Great Britain being first and the United States second.

It is not generally appreciated, even by Canadians, that two of the four great sea fishing areas of the world border on Canada. In addition, the lakes and rivers of the Dominion constitute approximately one-half of the fresh water of the globe, while the great inland sea of Hudson bay, still practically untouched, may be regarded as a reserve. Their extent alone suffices to render these various fishing areas remarkable.

The Atlantic coast line, from Labrador to the boundary between the United States and Canada, measures over 5,000 miles—not including the lesser bays and indentations. It embraces the Bay of Fundy, 8,000 square miles in area, the Gulf of St. Lawrence, ten times as large, and other waters which make the total area not less than 200,000 square miles. Off the coast are the noted fisheries of the "Grand Banks." Moreover, 15,000 square miles of inshore waters are entirely controlled by the Dominion, while Hudson bay has a shoreline of 6,000 miles.

Crossing the continent, the Pacific shoreline is over 7,000 miles long and has the unique advantage, thanks to its multitude of islands, of being exceptionally well-sheltered for fishermen. Finally,



CANADA'S FISHERIES EMPLOY 14,000 MOTOR BOATS

the fresh water lakes of the interior constitute an area of 220,000 square miles. Canada's share of the Great Lakes along the United States boundary alone covers 34,000 square miles. These varied waters yield at least fifty edible species.

That Canadian fishing waters are exceptional in fertility, as well as in area, is denoted by the fact that the entire catch of salmon, lobsters, herring, mackerel and sardines, nearly all of the haddock and many of the cod, hake and pollock are taken within 10 or 12 miles from shore. Further, the value of the Dominion's fisheries resources is enhanced by the circumstance that the colder waters of the northern latitudes produce fish of the finest quality. Climatic conditions also facilitate the work of distributing and marketing the catch.

PRIMARY FISHING OPERATIONS

The fisheries of the Atlantic coast may be divided into the deep-sea and inshore fisheries. Most of the deep-sea fishing is done in schooners of from 40 to 100 tons, carrying 12 to 20 men, and fishing with hook and line. Of late years the steam trawler has made its appearance and several are now operating. These vessels are usually 150 feet long, and the fishing is done with a

large bag-shaped net which is drawn along the bottom. The fish taken are principally cod, haddock, hake, pollock, and halibut.

In the inshore fisheries small vessels, running up to 40 tons, and large motor-boats are used. Gill-nets and hooks and lines are the means of capture. The fish taken, in addition to the varieties caught by the deep-sea fishermen, are the herring, mackerel, alewife, shad, smelt, flounder and sardine. The greatest lobster fishery in the world is carried on along the eastern coast of Canada, and excellent oysters are taken from the beds of New Brunswick, Prince Edward Island, and Nova Scotia.

PACIFIC FISHERIES

The predominating feature of the Pacific coast fisheries is the salmon. It possesses great food value, and the instinct that causes masses of these fish to surge up the rivers during the spawning season has lent itself to the establishment of a great canning industry. It is becoming increasingly evident, however, that some measure of conservation is required, particularly in regard to the renowned Fraser river fishery.

In addition to the salmon the very extensive halibut fishery, carried on off the coast of northern British Columbia, employs numbers of well

equipped steamers and vessels. The halibut are captured from dories by means of line trawls. Continuous fishing on a large scale has caused depletion in the more readily accessible waters and a closed season is proposed. Other important varieties caught on the Pacific coast are herring, pilchards and cod.

INLAND FISHERIES

The fisheries of the Great lakes employ steam tugs, gasoline, sail and row boats. The fishing is largely carried on by means of gill-nets and stationary pound-nets. The chief fish caught are trout, herring, whitefish, pickerel, pike, and perch. A large portion of the Great Lakes catch is marketed in the United States. Contrary to the opinion of the average deep-sea man, lake fishing is a hard and dangerous occupation, particularly in the spring and autumn. In Western Canada the lakes and rivers of the Prairie Provinces yield large quantities of fish. In some cases bush roads, a hundred miles or more in length, have been made to get out the catch from the northern lakes. Such difficulties of transportation hamper the industry greatly. Many of the largest and best sources of supply, such as Great Slave and Great Bear lakes, are as yet untouched by commercial fishing.

SECONDARY FISHING INDUSTRIES

The canning of fish constitutes an important branch of the industry on both the Atlantic and the Pacific coasts. Establishments have also been started to utilize the catch from the large northern lakes of the Prairie Provinces. During 1921 there were in operation in the Dominion, 538 establishments canning lobsters, 228 fish curing establishments, 58 canning salmon, 5 sardine and other fish canneries, 8 clam canneries and 5 fish oil factories. All of these canneries are inspected under the Meat and Canned Foods Act, in order to promote the extension of trade by improving the quality of the product, and to protect the public by preventing the packing of unsound fish and ensuring that all cans be correctly labelled.

Until late years general economic conditions, as well as those within the fishing industry itself, have rendered it difficult to find profitable methods of utilizing the great quantities of offal from the fisheries. More recently, closer attention has been paid to the problem of reducing waste, and the increasing degree to which the industry is becoming conducted by companies possessing considerable capital ensures that the manufacture of by-products will receive the careful study characteristic of large scale business enterprise.



SALMON ANGLING ON THE RESTIGOUCHE RIVER NEW BRUNSWICK

INCOME FROM FISHERIES RESOURCES

The fisheries of Canada yield a liberal and varied return. They produce an important contribution to the national food supply; they afford the means of livelihood to extensive communities; and they mother a large trade abroad which is heavily balanced in the Dominion's favour. The output for the year 1921, although adversely affected by unsettled markets, amounted to \$34,931,935. The quantities of the principal varieties, and their values as landed and as marketed, were as follows:

TABLE XXXVIII.—FISHERIES PRODUCTION, 1921, BY PRINCIPAL VARIETIES

Variety	Quantity	Caught and landed value	Marketed value
	cwt.	\$	\$
Salmon.....	878,000	5,076,000	9,305,000
Lobsters.....	393,000	3,067,000	5,143,000
Cod.....	2,033,000	3,693,000	4,594,000
Halibut.....	357,000	3,589,000	4,112,000
Herring.....	1,662,000	1,263,000	2,227,000
Whitefish.....	184,000	1,363,000	1,916,000
Mackerel.....	145,000	778,000	1,124,000
Haddock.....	269,000	474,000	899,000
Smelts.....	84,000	713,000	835,000
Pickarel.....	128,000	630,000	811,000
Trout.....	61,000	649,000	745,000
Sardines.....	152,000	161,000	646,000

There is a wide difference between the value of most varieties as "caught and landed" and their value as "marketed." The difference is

due to several factors, but is most pronounced with regard to those varieties, such as salmon and lobster, which must bear a considerably increased value to cover the cost of canning or other processes.

The national importance of the fishing industry is not to be measured solely by the variety and value of the annual yield. A material advantage accrues from the wide distribution of the developed fisheries, and from the fact that they thus increase the industrial diversity and stability of the various sections of the Dominion.

The commercial rise of the Pacific fisheries in recent years has had the effect, as illustrated by Table XXXIX, of radically altering the relative standing of the individual provinces in value of fisheries output. British Columbia has advanced to the leading position mainly as a result of the rising value of the salmon and halibut output but, despite decided increase in the comparative importance of British Columbia, all of the other provinces possess fisheries which support an extensive industry and afford a yield substantial in both volume and value.

The investment of capital represented by vessels, boats, nets, wharves and other property and equipment utilized in the primary operations of catching and landing fish during 1921 exceeded

\$26,000,000. The number of persons employed in that year was 55,000. The investment in canning and curing establishments aggregated \$19,400-000 and the employees of such plants numbered 14,000.

TABLE XXXIX—VALUE OF FISHERIES PRODUCTION BY PROVINCES, 1901 AND 1921

Province	Value of total production		Per cent from each province	
	1901	1921	1901	1921
	\$	\$		
Nova Scotia.....	7,990,000	9,779,000	31	28
Prince Edward Island.....	1,051,000	925,000	4	3
New Brunswick.....	4,193,000	3,691,000	16	11
Quebec.....	2,174,000	1,815,000	8	5
Ontario.....	1,428,000	3,064,000	6	9
Manitoba, Saskatchewan and Alberta.....	958,000	1,704,000	4	5
British Columbia.....	7,943,000	13,953,000	31	39
	25,737,000	34,931,000	100	100

TRADE IN FISHERIES PRODUCTS

While the fishing industry has attained large proportions, it has by no means reached the degree of development which the fisheries resources are capable of supporting. The limitations of the domestic market have been the chief restrictive factor. The per capita consumption of fish throughout the Dominion is small—probably not more than 25 pounds per annum. Greater local markets are being sought through improved

methods of shipping and by national advertising. Efforts are also being made to popularize many edible varieties of fish for which fishermen as yet have enjoyed little or no market. The main difficulty in regard to marketing arises from the fact that the centres of population, particularly the province of Ontario, are far removed from both the Atlantic and the Pacific fishing waters and the costs of transportation impose a commercial handicap which cannot be avoided.

TABLE XL.—FISHERIES PRODUCTION AND EXPORTS,
1912-1921

Year	Value of total production	Value of exports, domestic	Proportion of exports to production
	\$	\$	per cent
1912.....	34,668,000	16,705,000	48.2
1913.....	33,389,000	16,337,000	48.9
1914.....	33,208,000	20,624,000	62.1
1915.....	31,265,000	19,687,000	63.0
1916.....	35,861,000	22,378,000	62.4
1917.....	52,312,000	27,778,000	53.1
1918.....	60,251,000	33,578,000	55.7
1919.....	56,508,000	46,495,000	82.3
1920.....	49,241,000	36,608,000	74.3
1921.....	34,932,000	30,146,000	86.3

As a result of the domestic market conditions the fishing industry leans heavily upon export trade. The value of the exports is normally more than half of that of the total output of the fisheries. In this respect, fishing is comparable to the wheat-growing and pulp and paper industries, although it is not normally dependent upon markets abroad to the same degree. Nevertheless, fisheries

products comprise a class of merchandise which is conspicuous in furnishing a foreign trade surplus, exports usually amounting to about ten times the value of the imports. The foregoing table shows the relation which the value of exports in recent years has borne to that of the total output from Canada's fisheries.

Canada's export trade in fish has been long established on a large scale and reaches a wide range of markets. The chief customer is the United States, which has, for some years past, taken nearly half of the total exports. Important markets are found also in the United Kingdom, France, Cuba, the British West Indies, Oceania and Porto Rico. The other principal buyers are Brazil, Japan and Italy, but the trade also reaches into fifty or more minor markets in practically every quarter of the globe.

Canned and pickled salmon form the most valuable export commodity. This is produced almost entirely in British Columbia and exported to Great Britain, France, Australia, New Zealand, Japan, Straits Settlements and numerous other overseas markets. The United States buys fresh as well as pickled salmon in large quantities. Dried salt fish from the Atlantic fisheries stands second in importance as an export item. It consists largely of cod, haddock, hake, and pollock,

and is shipped to South America, West Indies, Italy and the United States. Fresh cod, haddock, pollock and halibut are also exported in substantial quantities, and there is a very large trade in herring, lobster, whitefish, mackerel and other varieties. Regarded as a whole, the trade in fisheries products is one of the most broadly diffused branches of Canada's foreign commerce.

FISHERIES ADMINISTRATION

The Federal and Provincial Governments of the Dominion have extended generous aid toward promoting the welfare of the fishing industry. Constant study has been devoted to the marketing problem, as well as to the measures essential to maintain production and prevent depletion. Fish culture is exceptionally well advanced. In 1921 the total distribution of eggs, fry and older fish, from main and subsidiary hatcheries, exceeded 845,000,000. Stations for scientific research under the Biological Board are maintained at St. Andrews on the Atlantic and Nanaimo on the Pacific coast, thus providing facilities for the first-hand study of practical problems affecting the various fisheries. In these and other forms, the public services charged with the administration of fisheries are exercising every care to preserve and enhance their value as a basic national asset.



THE BEAVER, THE INDUSTRIOUS EMBLEM OF CANADA

CHAPTER VIII

The Fur Trade

INDELIBLY associated with the earlier periods of Canadian history, fur resources merit a rank among the natural assets of the Dominion immeasurably higher than is suggested solely by the monetary value of the fur trade. It was the quest for fur that led the explorer over a great portion of the territory now embraced within the Dominion, and for several centuries the fur trade played a unique rôle in shaping political as well as economic development. With the coming of the settler, the lumberman and the miner, the fur trader has long since lost his commercial pre-eminence, but Canada is still conspicuous among fur-producing countries.

Several centuries of constant exploitation have not undermined the capacity of Canada's stock of fur-bearing animals to yield a leading contribution to the world's requirements of furs of superior quality. The immense unsettled

territories of the Dominion form the habitat of fur-bearing animals in abundance and exceptional diversity. Every province shares substantially in the returns derived from fur resources, and the Northwest Territories, comprising an area of approximately 1,200,000 square miles, is a reservoir from which, under wise methods of exploitation, a valuable annual catch may be taken in perpetuity.

TABLE XLI.—PRINCIPAL ITEMS OF FUR PRODUCTION,
SEASON OF 1921-1922*

Kind	Value	Number of pelts
Muskrat.....	\$ 4,690,000	3,045,100
Beaver.....	4,260,000	231,600
Mink.....	1,840,000	204,300
Marten.....	1,210,000	58,800
Fox, silver.....	730,000	5,000
Fox, white.....	700,000	18,300
Fox, red.....	470,000	37,900
Fisher or pekan.....	420,000	5,700
Otter.....	370,000	13,700
Skunk.....	310,000	132,800
Fox, cross or patch.....	290,000	5,700
Coyote.....	280,000	30,500
Ermine.....	250,000	446,600
Lynx.....	240,000	11,600
Others (23 kinds).....	399,000	74,200
All kinds.....	\$16,459,000	4,321,800

*Bureau of Statistics Preliminary Report.

The prolific yield from Canadian fur resources and the importance of the fur trade is indicated by the annual returns. The number of pelts taken in the season of 1921-22 exceeded 4,300,000, and their value aggregated \$16,450,000. During

the season of 1919-20 when fur prices were on a very high level the catch yielded a total return of \$21,000,000.

The beaver is the most renowned Canadian fur-bearer, although the muskrat is taken in much greater numbers and vies with the former in value of annual yield. Marten, mink, fox, fisher, otter and ermine are trapped in large numbers, and the range of fur resources includes many less prominent species.

DOMESTICATION OF FUR-BEARERS

Notable development in recent years has been achieved by the fur-farming industry. Canada—and more particularly the province of Prince Edward Island—has been a pioneer in respect of this industry. The successful domestication of the silver fox, and the well advanced experiments with mink, karakul sheep and other fur-bearers of high pelt value, have introduced a new and profitable branch of animal husbandry which has already reached considerable proportions. In 1922 there were on Canadian fur farms more than 21,000 silver foxes valued at about \$5,372,000. While the industry is still confined mainly to fox ranching, the natural conditions throughout great areas of the Dominion are admirably adapted to a wide extension of the scope, as well as the scale, of fur

farming enterprise. It is quite within the realm of probability that Canada's fur resources, instead of declining in the face of rigorous exploitation of wild fur-bearing animals, may be so substantially supplemented by the increase of fox, mink and other species, reared in captivity, as to yield a steadily mounting annual contribution to commerce.

COMMERCE IN FURS

Throughout its history the fur trade of Canada has been essentially an export business, conducted for many decades by companies holding monopolies granted by royal charters and extending over immense territories. The bulk of Canadian furs, assembled at scores of trading posts which long preceded the advance of settlement, were exported in raw state chiefly to England, but also to Germany, the United States and Russia. Almost fifty per cent of the furs sold at the famous London auctions came from Canada. Meanwhile the Dominion imported each year large quantities of furs of Canadian origin—of pelts trapped in the Canadian wilds, packed and shipped through Montreal and Toronto, sold in overseas markets, purchased and re-imported by Canadian manufacturers, and finally marketed by Canadian merchants.

TABLE XLII—EXTERNAL TRADE IN FURS

(Years ending March 31)

—	1914	1920	1921	1922
	\$	\$	\$	\$
<i>Exports—</i>				
United Kingdom.....	3,124,000	4,059,000	3,676,000	4,329,000
United States.....	2,176,000	16,595,000	8,008,000	10,526,000
Other countries.....	368,000	268,000	546,000	123,000
Total.....	5,668,000	20,922,000	12,230,000	14,978,000
<i>Imports—</i>				
United Kingdom.....	860,000	698,000	510,000	169,000
United States.....	1,777,000	10,989,000	4,689,000	7,025,000
Other countries.....	1,118,000	1,191,000	1,387,000	961,000
Total.....	3,755,000	12,878,000	6,586,000	8,155,000

The ancient channels of the fur trade were radically shifted by the general disruption of commerce following the outbreak of the Great War. America entered more prominently into the primary marketing of furs, and today the long-established London and Leipzig sales must compete with strong companies intent on directing Canadian pelts to the auctions held periodically at Montreal, Winnipeg, St. Louis and New York. The founding of Canadian sales, already attracting the custom of shippers and buyers in great numbers from within and beyond the Dominion, promises to fulfil the logical development of primary markets on a scale commensurate with Canada's importance in fur production and in international fur trade. Further, Canadian furriers

have built up an extensive industry in fur dressing, dyeing and manufacturing, thus realizing in full measure the utility of a basic resource which is no less valuable in domestic than in external trade.

The foregoing table indicates the value of Canada's imports and exports of furs and the main channels through which they pass. The statistics for later years, compared with those for 1914, reflect the manner in which the distribution of the fur trade has been altered. Prior to the outbreak of war the bulk of Canada's exports reached the United Kingdom, but in more recent years the United States has ranked as the leading customer.

It is difficult to determine the degree to which the volume of fur production in late years has been affected by the increased intensity of exploitation. When the systematic collection of statistics, recently initiated, has been continued over a sufficient period, it will afford a valuable basis for judging the trend of fur production. In the meantime, the danger of depleting the capital stock is fully recognized.

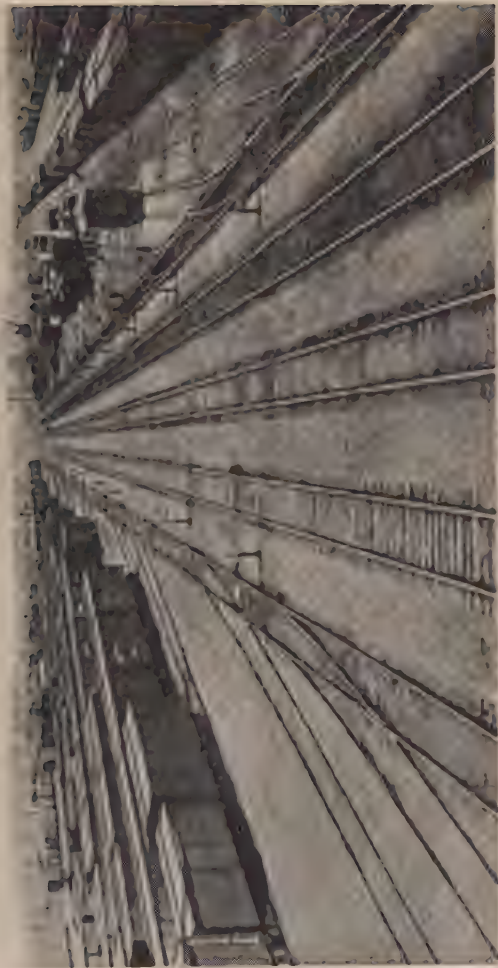
Many factors have operated to intensify exploitation. The natural habitat of fur-bearing species has been reduced by the advance of lumbering, agriculture and mining; forest fires have taken

a heavy toll; higher prices and growing demands for good furs have spurred the trapper to greater effort; new transportation routes and facilities carry the trapper and his supplies into regions formerly inaccessible or remote; his weapons and equipment are infinitely superior to those of yesterday. Against this array of circumstances the task of guarding against depletion is one of great difficulty, but every endeavour is being made through the enforcement of trapping restrictions, the creation of wild animal sanctuaries, the supervision of the fur trade and the close study of the annual catch, to ensure the preservation of Canada's wild fur-bearing species as a permanent source of national income.

In addition to fur-bearing animals, so conspicuously identified with the earlier history of Canadian commerce, the Dominion is splendidly endowed with other wild life which, though not commercialized in the same sense or degree, forms a national asset of inestimable value. Canada possesses a wealth of game species as well as of the bird life indispensable to agriculture and horticulture. The moose-hunting grounds of Eastern Canada, the bear and mountain sheep of British Columbia, game animals, birds and fisheries in

unusual variety, have given the Dominion exceptional natural advantages in its means of recreation for the hunter and the angler.

The economic value of wild life, and of the magnificent scenic resources which each year attract visitors from abroad in great numbers, have been given practical recognition by the federal and provincial governments. In no respect has the administration of Canada's natural resources been more wisely exercised than in the liberal provision made for the creation and maintenance of a system of national and provincial parks and game preserves. While these areas, covering many thousands of square miles, indirectly yield a generous return upon the public monies invested, they represent a factor in national well-being which cannot be fully measured or appraised by monetary standards.



RAILWAY YARDS AT WINNIPEG, WORLD'S GREATEST PRIMARY GRAIN MARKET

CHAPTER IX

Transportation, Banking, Manufacturing

THE character and enterprise of Canada's transportation and banking systems have rendered incalculable service in the development of the national domain. They have been responsible in great measure for the extension of the basic industries of the field, forest, mine and fishery, and they have contributed in no small degree to the upbuilding of manufacturing industries.

There are few countries so dependent on transportation as Canada, and few there are of equally large extent so well provided with such services. The need for a large railway mileage can be readily understood when it is remembered that the distance from Halifax to Vancouver is some 3,500 miles, and that the great prairie grain-growing provinces are situated far inland from both the Atlantic and Pacific coasts. Moreover, the older industrial sections of Ontario and Quebec, though tributary to the St. Lawrence waterway,

are located well towards the middle of the continent, and are also many hundreds of miles distant from one of their best markets, the western provinces. This problem of overcoming great distances was the reason why the agreements for the confederation of the Canadian provinces into the Dominion of Canada contained clauses stipulating that railways should be built connecting the several units.

TABLE XLIII—DISTANCES IN CANADA

Distance from	To Vancouver	To Winnipeg	To Toronto	To Montreal	To Halifax
Vancouver.....		1,465	2,698	2,832	3,494
Prince Rupert.....	610	1,751	2,983	3,118	3,780
Calgary.....	642	823	2,055	2,190	2,852
Edmonton.....	769	796	2,028	2,163	2,825
Regina.....	1,108	357	1,589	1,724	2,386
Saskatoon.....	1,095	470	1,702	1,837	2,499
Winnipeg.....	1,465	.....	1,232	1,367	2,029
Fort William.....	1,885	419	813	970	1,676
Toronto.....	2,698	1,232	.....	334	1,040
Ottawa.....	2,721	1,256	247	111	816
Montreal.....	2,832	1,367	334	.....	*706
Quebec.....	2,815	1,350	507	173	*679
St. John.....	3,240	1,775	816	482	*224
Sydney.....	3,650	2,185	1,246	912	288
Halifax.....	3,494	2,029	1,040	706	.....

*Via steamer, St. John to Digby.

Transportation, in its relation to Canada, divides itself into three distinct features: the railways, the ocean services, and the unique system of inland waterways, known as the St. Lawrence system. There is a railway trackage

of 39,840 miles, comprised almost wholly in two large systems, the Canadian National Railways and the Canadian Pacific Railway. The ocean services consist of (1) those steamship lines sailing from Montreal, Quebec and the Atlantic ports, mainly with European and West Indian destinations, and (2) lines sailing from the Pacific ports of Vancouver and Victoria to China, Japan, Australia, New Zealand and to the west coasts of South America, Mexico and the United States. The St. Lawrence system of inland waterways penetrates from the Straits of Belle Isle to the head of Lake Superior, a distance of 2,340 miles into the very heart of the continent, providing a 14-foot waterway as an outlet to the Atlantic seaboard for the harvests of the prairies and the agricultural and industrial products of Ontario and Quebec. For seven and one-half months in the year a channel 35 feet deep is available on the St. Lawrence for ocean steamers as far up as Montreal.

RAILWAY FACILITIES

The Canadian National Railways system consists of what was formerly called the Inter-colonial, built after Confederation to connect the Maritime Provinces with Upper Canada; the Grand Trunk, the Grand Trunk Pacific, the National Transcontinental, the Canadian Northern

and the partially completed Hudson Bay railway. The Grand Trunk is the pioneer railway of Ontario and Quebec, whilst the Canadian Northern, the Grand Trunk Pacific and the National Transcontinental are children of the first decade of the present century, when railway building was in its heyday.

The Intercolonial railway, consisting, with branches, of 2,290 miles of line, extends from Halifax and St. John to Levis. The Grand Trunk runs from Quebec and Portland, Maine, to Chicago on the west and North Bay on the north, and has 4,776 miles of roadway. The National Transcontinental, including the Lake Superior branch, has a mileage of 2,007, and the main line runs from Moncton to Winnipeg. The Grand Trunk Pacific, extending from Winnipeg to Prince Rupert on the Pacific coast, has a total mileage of 2,756. The Canadian Northern, extending from Quebec to Vancouver, has a total mileage of 9,900. This vast system has now been consolidated under one management, and the service it offers is supplemented by that of the Canadian Government Merchant Marine sailing from both Atlantic and Pacific ports to all parts of the world. A system of hotels across the continent and an extensive network of telegraph lines are also operated by the railway. All told, the Canadian

National Railways comprise a total of 22,114 miles of track, serving all the principal seaports and cities of the Dominion and large areas of its agricultural lands.

The Canadian Pacific railway was the pioneer line in opening up the Canadian West. The company was chartered in 1881, and the railway, which included a certain amount of mileage previously built, was completed in record time from Montreal to Burrard Inlet in 1885. Its land system now extends from St. John, New Brunswick, to Vancouver, while it also controls the Dominion Atlantic Railway in Nova Scotia and the Esquimalt and Nanaimo Railway on Vancouver Island. The mileage is made up of main line, Montreal to Vancouver, 2,886 miles; other lines and branches in Canada, 11,935 miles, while in addition it controls mileage in the United States totalling 5,103 miles, making a grand total of 19,924 miles. An important line runs from Toronto connecting near Sudbury with the main line. In crossing the prairies the main line of the Canadian Pacific Railway takes a southerly route, passing through Winnipeg, Regina and Calgary, whilst the main lines of the Canadian National, passing through Winnipeg, Saskatoon and Edmonton, serves more northerly territory. The Canadian Pacific also operates steamship services on both the Atlantic

and Pacific, with a total register of about 441,000 tons, and conducts its own hotel and telegraph systems as well.

Electric railways in Canada have a total length of track of 2,187 miles. In 1921 they carried 910,000,000 passengers and 2,286,000 tons of freight. The greater part of the mileage is comprised of city systems, although of recent years there has been a steady growth of radials extending through well-populated rural areas. An extensive radial system extends, for instance, from Toronto to nearby points in Western Ontario. Hamilton is another important radial centre, as is also Brantford. The environs of Montreal are served by the Montreal Tramways and the Montreal and Southern Counties railways. The largest electric traction system in Canada is the British Columbia Electric railway which operates the street railway systems in Vancouver and Victoria and also an extensive system serving the whole lower Fraser River valley. Both freight and passengers are carried. The Lake Erie and Northern, running from Galt through Brantford to Port Dover, also operates both freight and passenger services. The London and Port Stanley, operated by the Hydro-Electric Power Commission of Ontario, is an example of a steam railway that has been electrified. Electrification of a portion of the Timiskaming and

Northern Ontario Railway is also being considered. With large supplies of cheap power, many districts in Canada will offer opportunity for the electrification of steam railways as density of population increases and more difficult mining conditions increase the price of coal.

ATLANTIC PORTS AND STEAMSHIP SERVICES

The chief Canadian ports on the Atlantic are Halifax, St. John and Sydney, the last mentioned the centre of the great coal and iron industry of the Maritime Provinces. Halifax and St. John are the two large Canadian winter ports, through which pass the traffic that would otherwise go through Montreal and Quebec were the St. Lawrence river not frozen over. The Canadian Atlantic ports have a decided advantage over United States Atlantic ports in the matter of distance to European ports, from Halifax to Liverpool being 2,485 miles, and from St. John to Liverpool 2,747 miles, as compared with 3,010 miles from New York to Liverpool.

Passenger and freight services to Europe are provided by the Canadian Government Merchant Marine under the management of the Canadian National Railways, Canadian Pacific Steamships, Limited, the Cunard Anchor-Donaldson, Furness-Withy, Head and White Star

Dominion Lines. Other lines maintain services to West Indian, South American, Australian and European ports. The Canadian Government Merchant Marine operates to St. John's, Newfoundland, Cuba, the West Indies and South American as well as to various European ports.

ST. LAWRENCE PORTS AND WATERWAY

Although situated 1,000 miles inland Montreal, at the head of ocean navigation on the St. Lawrence river, is one of the great ports of the world. In point of foreign trade it is second only to New York on this continent, despite the fact that it is icebound for four and one-half months in winter. It has the most modern facilities for handling grain and other cargoes, and provides 16 miles of waterfront on the St. Lawrence with dockage capable of accommodating over 100 ocean vessels. An electric belt line railway 65 miles in length connected with the large steam railway lines serves the entire water front. The development of the port has been carried out at a cost of \$35,000,000, and is in charge of a Board of Harbour Commissioners appointed by the Dominion Government. Two large grain elevators, with a combined capacity of 6,662,000 bushels, are operated by the Harbour Commissioners, and the Grand Trunk elevators have a capacity of 2,150,000



COLD STORAGE PLANT, MONTREAL HARBOUR

bushels. Arrangements have been made for the construction by the Harbour Commissioners of a new elevator which will have an ultimate capacity of 10,000,000 bushels. Since 1881, when the Government took charge of the deepening of the St. Lawrence, the depth of the waterway leading to Montreal has been increased from 10 ft. to 35 ft.

Quebec, on the St. Lawrence, 180 miles nearer the Atlantic, is also an important port with an excellent harbour. The ocean lines terminating at Montreal make Quebec a port of call.

Mention should be made of the St. Lawrence waterway, extending from Montreal to the head of Lake Superior. Much of the grain grown on the prairies reaches market over this route. Just above Montreal the St. Lawrence canals begin. These, and the navigable stretches of the river itself, provide a navigable channel between Montreal and Lake Ontario for vessels of 14 feet draught. The new Welland Canal, between Lake Ontario and Lake Erie, has a navigable depth of 25 feet, whilst the depth of the canal at Sault Ste. Marie, connecting Lake Superior and Lake Huron, is $19\frac{1}{2}$ feet. From Lake Superior to the ocean there are altogether 74 miles of canals. This far-reaching waterway furnishes a cheap and efficient route of transportation for grain and bulky freight, and is of immense value to the commercial and industrial interests of Canada.

PACIFIC PORTS AND STEAMSHIP SERVICES

On the Pacific seaboard there are as yet but two large seaports, Vancouver and Victoria. Prince Rupert, with its magnificent natural harbour, will no doubt in time become a port of some magnitude as northern British Columbia develops. Victoria, 73 miles distant from Vancouver, is a convenient port of call for the ocean steamship lines sailing from Vancouver to China, Japan, Australia, New Zealand and the Orient generally, as well as to the United States and South American Pacific ports. The depth of water at the wharves in the outer harbour of Victoria is 33 feet at low tide, while in the inner harbour it ranges from 20 feet to 12 feet.

Vancouver is rapidly growing in importance as a port. The successful trial shipment of a cargo of wheat to Liverpool through the Panama Canal in 1915 has resulted in a portion of the grain crop of the prairies being shipped to Europe *via* Vancouver, and the Dominion Government has constructed there a storage elevator of 1,250,000 bushels capacity. In 1922, approximately 15,000,000 bushels of wheat were shipped from this port, and plans are under way to provide greater elevator capacity and otherwise equip the port to ship a volume of grain several times greater than it has hitherto been able to handle. Large quantities of British Columbia timber are shipped from

Vancouver annually all over the world. It is the western terminus of the Canadian National and Canadian Pacific railways, and the Great Northern and the Chicago, Milwaukee and St. Paul also make it their western Canadian terminus. In addition to splendid port facilities, it has one of the best natural harbours in the world.

The Canadian Government Merchant Marine operates lines of steamships from Vancouver to Australia and the Orient, to Mexico, and to Great Britain via the Panama Canal. The Canadian Pacific has a splendid line of steamers running to the Orient, whilst there is also a regular service to Honolulu, Australia and New Zealand. The Canadian Government Merchant Marine maintains a coast service from Vancouver and Victoria to Prince Rupert, and the Canadian Pacific has a line running from Vancouver to Victoria, and also one to Seattle. With the continual growth of British Columbia and Western Canada generally, Vancouver, now that the Panama Canal provides a shorter route to Europe, is destined to grow rapidly as a great world port.

The Canadian Banking System

The Canadian banking system is noted for its elasticity and its ability to adapt itself to the requirements of commerce and industry. Consisting, as

it does, of a number of large and powerful banks, with branches ramifying to the most remote corners of the country, and with either offices or correspondents in the large banking centres of the world, it is admirably equipped to assist its customers, whether the service sought be in the form of loans, collections, transfers of funds or trade information. Especially since the conclusion of the war have the banks added very considerably to their facilities for financing foreign trade.

The business of banking in Canada is conducted practically in its entirety by the chartered banks, fifteen in number, with some 4,500 branches, of which about 200 are in other countries. These operate under charters, granted under the Bank Act and terminating at the end of decennial periods. The Bank Act also is revised every ten years, a proceeding which enables the machinery of banking to be kept abreast of the changing and growing requirements of business.

FLEXIBILITY OF CREDIT FACILITIES

Although the banks are surrounded by many legislative safeguards designed to protect the public, they have been allowed such a degree of freedom in the conduct of their business that the Canadian banking system is one of the most flexible in exist-



GRAIN ELEVATORS AT FORT WILLIAM

ence. Questions of policy are left entirely in the hands of the managements. Moreover, no fixed proportion of reserves to liabilities is prescribed by law, although it is specified that at least 40 per cent of the cash reserves held shall be in Dominion notes. As a matter of fact, nearly all the banks have built up large reserve funds, in many cases exceeding or equalling their paid-up capital.

It is in the note issue, however, that the most important feature making for flexibility occurs. In many countries bank note circulation is based upon government or other securities required by law to be held in fixed amount against it and thus tending to maintain the issue at an arbitrary figure regardless of the activity of trade and industry; but in Canada it is merely a first charge on the general assets of the banks including the double liability of shareholders. It can thus expand automatically with the demands of business. In times of very brisk business it can always be increased by the issue of additional notes to any amount, provided they are secured by the deposit of gold or Dominion notes, dollar for dollar, in the central gold reserve. Automatically, also, it contracts when the need passes; for, as it is a source of profit, each bank daily presents for redemption the notes of other banks it receives in the ordinary course of business, and these are

held until the financing of further business transactions of the issuing bank's customers calls them forth again. In this way, those periods of plethora and dearth of funds, so common in countries where similar provision has not been made, are avoided.

Canadian banks are restricted in the amount of notes they may issue to the amount of their unimpaired paid-up capital plus the amount of gold and Dominion notes they deposit in a central gold reserve. In the crop-moving period, however, when the great western grain crops are moving to the sea-board, they are permitted to issue excess circulation to an amount not exceeding 15 per cent of their combined unimpaired capital and rest, a privilege which, when war broke out, was extended to cover the whole year.

BANKING AID TO INDUSTRIAL DEVELOPMENT

The powers with which Canadian banks have been clothed have enabled them to be of vital assistance in developing the natural resources of the country, and in promoting industry and trade, both domestic and foreign. By the Bank Act they are virtually vested with the ownership of the goods and products on the security of which

they lend. Although the nominal owners of such goods or products can dispose of them, the bank, if need arises, may step in and take possession. The Act gives them power to loan money on standing timber and licenses to cut timber, to advance money for the building of ships and to acquire and hold warehouse receipts, or bills of lading, as collateral security for the payment of any debt incurred in their favour. They may "lend money to any wholesale purchaser or shipper of or dealer in the products of agriculture, the forest, quarry and mine, or the sea, lakes and rivers, or to any wholesale purchaser or shipper of or dealer in live stock or dead stock or the products thereof, upon the security of such products, or of such live stock or dead stock or the products thereof." They may also "lend money to a farmer upon the security of his threshed grain grown upon the farm, or to any person engaged in business as a wholesale manufacturer of any goods, wares and merchandise, upon the security of the goods, wares and merchandise manufactured by him, or procured for such manufacture." By the amendments of 1915 and 1916 they may loan money to farmers for the purchase of seed grain and take the resulting crop as security.

TABLE XLIV—CANADIAN BANK STATISTICS

(As at July 31, 1923)

Name of bank	Head office	Paid-up capital	Rest or reserve fund	Total assets
Bank of Montreal.....	Montreal..	\$27,250,000	\$27,250,000	607,439,861
Bank of Nova Scotia.....	Halifax....	10,000,000	19,500,000	216,531,311
Bank of Toronto.....	Toronto....	5,000,000	6,000,000	96,941,549
Molson's Bank..	Montreal..	4,000,000	5,000,000	71,883,974
Banque Nationale.....	Quebec....	2,995,310	400,000	50,864,088
Banque Provinciale du Canada.....	Montreal..	3,000,000	1,500,000	36,033,350
Union Bank of Canada.....	Winnipeg..	8,000,000	1,750,000	120,263,234
Canadian Bank of Commerce*	Toronto....	15,000,000	15,000,000	374,138,891
Royal Bank of Canada.....	Montreal..	20,400,000	20,400,000	514,910,903
Dominion Bank..	Toronto....	6,000,000	7,000,000	120,587,063
Bank of Hamilton*.....	Hamilton..	5,000,000	4,850,000	69,895,707
Standard Bank of Canada.....	Toronto....	4,000,000	2,750,000	76,879,068
Banque d'Hoche-laga.....	Montreal..	4,000,000	4,000,000	69,866,437
Imperial Bank of Canada.....	Toronto....	7,000,000	7,500,000	118,611,403
Sterling Bank of Canada.....	Toronto....	1,234,300	500,000	22,966,266
Weyburn Security Bank.....	Weyburn..	524,560	225,000	3,648,572
Total.....	.....	\$123,404,770	\$123,625,000	2,571,461,677

*Since the above statement was issued the absorption of the Bank of Hamilton by the Canadian Bank of Commerce has taken place.

ADVANTAGES OF BRANCH SYSTEM

The Canadian system of branch banks, comprised of a few large banking corporations with numerous branches, makes for solidarity. In

practice, it is found that should a bank's position become weakened, the other banks in nearly every instance come to its assistance, either tiding it over its difficulties or absorbing it. The fact also, that a bank's business is distributed over thousands of miles of country in itself tends to spread and diversify risks, and the strength of the large Canadian banking corporations enables them to stand losses which would cripple small local banks.

Another advantage of the branch banking system is the facility with which it can mobilize the country's resources in time of need. A nationwide system of branch banks, as distinguished from a system of isolated local banks, can utilize the resources of one part of the country to tide another, temporarily less fortunate, over its difficulties. In a new country it is a distinct advantage to have a banking mechanism thus able to assist new and developing communities until they have become firmly established.

There are many other advantages a branch bank system possesses for a country with such a far-flung territory as Canada. New and small communities, not in themselves able to support a local bank, are given the benefits of a banking service by the establishment of a branch or sub-agency. The branch bank system gathers up the funds of the conservative, saving communities

and puts them at work by lending them to enterprising, go-ahead communities. The capital of the country is thus employed continuously.

TABLE XLV—DISTRIBUTION OF BRANCH BANKS

(As at June 30, 1923)

In Canada—	
Nova Scotia.....	154
Prince Edward Island.....	31
New Brunswick.....	129
Quebec.....	1,197
Ontario.....	1,493
Manitoba.....	289
Saskatchewan.....	517
Alberta.....	335
British Columbia.....	220
Yukon.....	3
Total in Canada.....	4,368
In Newfoundland.....	37
Elsewhere.....	166
Grand total.....	4,571

The branch system also tends to equalize interest rates as between different sections of the country. Investigation shows that there is less variation between rates charged borrowers in the new areas of the west and in the older-settled east in Canada than in other similarly placed countries. A bank with branches from the Atlantic to the Pacific can, moreover, collect a customer's bills and transfer his funds for him

cheaper than a bank which has no branches. Large firms, requiring an extensive line of credit, do not find it necessary to do business with more than one bank, a most obvious advantage.

One of the most valuable ways in which a banking organization with widespread branches can be of service to its customers is in supplying them with credit and trade information. From its branch managers all over Canada the head office of a Canadian bank has its finger on every variation of the industrial pulse. The customer in Vancouver can promptly secure a report on the credit standing of a firm in Montreal or Halifax from an organization trained in making such reports and interested in the welfare of his business. He can likewise get a report on the crops in any district, or the conditions of a given industry in any locality through the local manager of his bank in that locality. And not only can he secure such information in Canada, but in foreign countries as well; for all of the larger banks have branches abroad and correspondents throughout the civilized world. Elaborate foreign departments, designed to assist customers interested in export trade, and statistical departments manned by experts, are maintained by most of the larger banks.

CURRENCY SYSTEM

The denominations of money in the currency of Canada are dollars, cents and mills. The cent, the smallest coin in use, is one-hundredth part of a dollar, and the mill one-tenth part of a cent. The standard of fineness for gold coins is nine-tenths gold, and British and United States gold coins are legal tender. The privilege of issuing notes is restricted to the Dominion government and the chartered banks.

The Dominion government issues Dominion notes, which are legal tender, in denominations of \$1, \$2, \$5 and certain other large-size denominations used chiefly in clearing-house transactions between banks. They may be issued in any amount. Prior to the war, the security behind Dominion notes consisted of 25 per cent gold for the first fifty million dollars of such notes and dollar for dollar in gold for amounts in excess of fifty million. They were redeemable in gold. The war necessitated the suspension of redemption in gold, and by special legislation the Government was given power to issue Dominion notes to the banks upon the pledge of such securities as were satisfactory to the Treasury Board. To insure the retirement of these notes as soon as the need for them was past, interest at not less than 5 per cent per annum was charged the banks. At



FORT WILLIAM, AT HEAD OF GREAT LAKES, ST. LAWRENCE WATERWAY

the same time bank notes were made legal tender, and an issue of twenty-six million dollars of Dominion notes formerly issued without authority prescribed by law, largely to implement railway guaranties, was legalized.

Manufacturing

Numerous factors have combined to give Canada a remarkable rate of growth in the field of manufacture. The banking system has afforded capital and encouragement to sound manufacturing enterprise. Unusually extensive transportation services have facilitated the assembling of raw materials at points favourably situated for their manufacture and distribution in finished form. Abundant water-powers have supplied ample and cheap energy. The expansion of agriculture, mining and other branches of basic industry has had the double effect of enlarging the domestic market for manufactured goods and of increasing the variety and volume of natural products available for the secondary processes of factory and mill. These and other advantages have not only given a breadth of opportunity to Canadian initiative, but have attracted manufacturing capital and enterprise from abroad. American manufacturers, in particular, have entered the Canadian field and have been an active factor in the Dominion's

industrial growth. British interests are likewise well represented. The stimulus of the war period added a further impetus of far-reaching effect in giving industrial Canada of today a wide range of manufacturing as well as of basic development.

Between the years 1900 and 1920, the number of manufacturing establishments in Canada increased from 14,600 to 42,400, and the number of employees from 339,000 to 684,000. The value of the products rose from \$481,000,000 to \$4,019,000,000 and the capital invested in manufacturing concerns from \$447,000,000 to \$3,439,000,000. The figures representing the values of investment and of annual production for 1920 reflect a considerable degree of price inflation, but the increase in the number of establishments and of employees clearly indicates that the measure of real growth has been such as places Canada in a position of substantial importance among manufacturing countries.

The provinces of Ontario and Quebec together possess the major portion of Canada's manufacturing industries. These provinces include 60 per cent of the total population of the Dominion but nearly 80 per cent of the persons employed in manufacturing. British Columbia, with a relatively small population, is not far behind either Ontario or Quebec in regard to the number of persons, per thousand of population, who derive their livelihood from manufacturing

pursuits. Nova Scotia and New Brunswick are also well advanced. The Prairie Provinces, still in their industrial infancy, have made rapid strides along such lines as flour-milling and meat-packing.

TABLE XLVI.—STATISTICS OF MANUFACTURES, BY PROVINCES, 1920

Province	No. of establishments	Capital	No. of employees	Value of products
Nova Scotia.	2,440	\$ 148,194,000	28,342	\$ 163,059,000
Prince Edward Island.....	525	3,153,000	1,623	6,982,000
New Brunswick..	1,560	109,393,000	21,685	113,628,000
Quebec.....	11,518	1,030,570,000	205,107	1,120,263,000
Ontario.....	17,538	1,703,454,000	334,192	2,010,484,000
Manitoba.....	1,858	118,462,000	28,687	175,495,000
Saskatchewan...	2,298	40,019,000	10,394	72,390,000
Alberta.....	1,983	60,391,000	14,316	98,245,000
Brit. Columbia..	2,673	224,423,000	40,892	258,545,000
Yukon.....	13	1,468,000	60	280,000
Canada.....	42,406	\$3,439,527,000	684,698	\$4,019,371,000

Canadian manufacturing has advanced on a broad front. The leading branches of manufacture, ranked according to the value of the output, are closely related to the Dominion's basic development. They have enjoyed unique opportunities for growth owing largely to the extension of farming and forest industries. Slightly more than one-half of the total value of manufactured output in 1920 was contributed by vegetable, animal, and wood and paper products. The raw materials entering into such manufactures are drawn mainly from agriculture, lumbering, ranching, fishing, and other basic industries within the Dominion.

There are, however, very important classes of industries depending heavily upon imported raw materials. Such groups as the iron and steel and the textile industries have played a prominent part in widening the scope of manufacturing enterprise.

TABLE XLVII.—STATISTICS OF MANUFACTURES, 1920, BY GROUPS OF INDUSTRIES

Industrial groups	No. of establishments	Capital	Per cent of total capital
Vegetable products.....	4,233	\$396,000,000	11.5
Animal products.....	4,823	222,000,000	6.5
Textile products.....	4,528	322,000,000	9.4
Wood and paper products.....	7,867	772,000,000	22.4
Iron and steel products.....	1,690	643,000,000	18.7
Non-ferrous metal products.....	324	109,000,000	3.2
Non-metallic mineral products...	866	144,000,000	4.2
Chemical and allied products...	464	122,000,000	3.5
Miscellaneous industries.....	1,421	500,000,000	14.5
Construction, hand trades and repairs.....	16,190	209,000,000	6.1
Total.....	42,406	\$3,439,000,000	100.0

Industrial groups	Value of products	Per cent of total value of output
Vegetable products.....	\$775,000,000	19.3
Animal products.....	553,000,000	13.8
Textile products.....	466,000,000	11.6
Wood and paper products.....	724,000,000	18.0
Iron and steel products.....	715,000,000	17.8
Non-ferrous metal products.....	101,000,000	2.5
Non-metallic mineral products.....	129,000,000	3.2
Chemical and allied products.....	128,000,000	3.2
Miscellaneous industries.....	120,000,000	3.0
Construction, hand trades and repairs.....	308,000,000	7.6
Total.....	\$4,019,000,000	100.0

Table XLVII suggests the magnitude of the main groups of secondary industry. While the figures for 1920 cover a period of high prices and exceptional activity, they serve to illustrate the directions in which manufacturing enterprise has been diffused.

Vegetable products, embracing such commodities as flour, sugar and tobacco, took first place in 1920 in point of value. The "wood and paper" and "iron and steel" groups were slightly lower in that respect but surpassed "vegetable products" in certain other regards. The different groups of industry vary so greatly in character that the monetary sum of the output alone fails to suggest their comparative importance in furnishing employment or in supporting communities which serve to balance national development and to broaden the scope of business opportunity. For example, although the "wood and paper" industries were excelled in 1920 by the "vegetable products" group in regard to the gross value of production the former employed nearly twice as many persons and almost twice as much capital.

There is a further radical shifting of the relative standing of the various groups when judged by the net value added to the raw materials instead of by the gross value of the products. In 1920 the value of the output of flour-milling

slightly exceeded that of the pulp and paper industry but the flour mills added less than \$35,000,000 to the value of their raw materials, as against more than \$150,000,000 added through the manufacturing processes of the pulp and paper mills.

TABLE XLVIII.—STATISTICS OF MANUFACTURES, 1920,
BY GROUPS OF INDUSTRIES

Industrial groups	Number of employees	Per cent of total	Net values added by manufacturing	Per cent of total
			\$	
Vegetable products.....	72,900	10·6	236,000,000	12·9
Animal products.....	48,700	7·1	153,000,000	8·4
Textile products.....	99,700	14·6	193,000,000	10·5
Wood and paper products	143,700	21·0	416,000,000	22·7
Iron and steel products...	146,200	21·4	365,000,000	20·0
Non-ferrous metal products.....	23,200	3·4	53,000,000	2·9
Non-metallic mineral products.....	18,800	2·7	54,000,000	3·0
Chemicals and allied products.....	17,600	2·6	65,000,000	3·6
Miscellaneous products...	24,900	3·6	95,000,000	5·2
Construction, hand trades and repairs.....	89,000	13·0	200,000,000	10·8
Total.....	684,700	100·0	1,830,000,000	100·0

Food products form a heavy item in Canada's manufactured output. Slaughtering and meat-packing led all other single industries in value of products in 1920 but held only a very small margin over flour-milling. Abundant supplies of high-grade wheat, combined with ample power and



HEART OF TORONTO'S BUSINESS SECTION

transportation facilities, have placed Canada in the front rank as a milling country. There are, throughout the Dominion, over 1,300 mills with an aggregate daily capacity exceeding 128,000 barrels.

Other industries contributing largely to the output of food manufactures include dairy factories, sugar refineries, baking and confectionery establishments, and the plants engaged in the canning of fish, fruit and vegetables. The industries of this class, except sugar-refining, are associated mainly with the finishing of domestic natural products.

Of the other branches of manufacturing founded essentially upon raw materials of Canadian origin, those utilizing forest products closely rival food manufactures in value of output. Saw-milling and pulp and paper manufacture stand high among the individual industries of the Dominion. Furniture factories and the plants making a great variety of wood and paper products also add materially to the total value of manufactures.

Chemical manufacturing, closely related in certain phases to native resources and attracted especially by cheap waterpower, has recorded large growth. With the passing of the exceptional demands of the war period, the chemical output has been reduced, but represented a total value of about \$100,000,000 in 1922. The products

include paints and varnishes, soap, medicinal preparations, explosives, matches, fertilizers, calcium carbide and cyanamide, wood distillates and many others.

The leather industries have long been established on a considerable scale, including large tanneries, boot and shoe factories and extensive manufacture of harness, saddlery and other leather goods. Cement, glass, abrasive goods, and clay and stone products support an important group of industries. The manufacture of agricultural implements has naturally been highly developed owing to the great domestic market. Similarly, the requirements of transportation have given rise to extensive manufacturing of automobiles, cars, carriages and wagons, and, during the war, ship-building became a very active branch of Canadian industry. The production of electric light and power and of electrical apparatus and supplies on a large scale go hand in hand with the utilization of the Dominion's exceptional water-power resources. The capital investment in electric light and power plants is greater than in any other single branch of manufacturing in Canada.

The classes of manufacturing less intimately allied with Canada's basic resources have attained a considerable degree of development. While iron

ore, rubber, petroleum, tobacco, wool, cotton and other fibres are mainly or wholly imported, a substantial proportion of Canada's manufacturing output is contributed by iron and steel, textiles, refined oils, rubber goods and tobacco manufactures.

In rubber manufacturing Canada has made pronounced growth, and stands fourth among the countries of the world as a manufacturer of rubber goods. The products of textile manufacturing cover a wide range, with a total value in 1920 of \$465,000,000. The textile industries rank high in the extent of employment afforded by manufacturing in general. Cotton mills are the chief branch of textile industry, but there is likewise a large production of woollens, hosiery and knit goods, clothing and cordage. Rolling mills and steel furnaces, foundries and machine shops and the manufacture of boilers and engines, structural iron work, tools, wire, cutlery and hardware are leading branches of the iron and steel industry. Brass castings, aluminium ware, ferro-alloys, the reduction and refining of silver, metallic roofing and flooring, plumbing and tinsmithing supplies and products figure prominently in the aggregate output of the metal industries.

SOURCES OF INDUSTRIAL CAPITAL

An immense sum of new capital has been required to finance the rapid growth of Canada's manufacturing industries. The aggregate capital investment in such industries grew from slightly less than \$450,000,000 in 1900 to more than \$3,400,000,000 in 1920, an increase in excess of 600 per cent. In order to recruit capital on such a scale and with such rapidity Canada, in common with other young countries, has drawn heavily upon the investors of older nations for industrial purposes as well as for municipal improvements, railway construction and other enterprises. Huge funds have been attracted, particularly from British and American sources. Of the total capital received from abroad for all purposes British investors have supplied the greatest volume but United States interests have been foremost in the field of industrial investment. Parent manufacturing concerns in the United States have been especially active in establishing branch plants and subsidiary companies in the Dominion in order to cultivate the Canadian market at closer range, to grow as Canadian industries with the expansion of the market, and to enjoy the benefits of trade arrangements made for units of the British Empire or of other preferential trade agreements.

TABLE XLIX.—OWNERSHIP OF INDUSTRIAL CAPITAL

(Securities of incorporated and joint stock companies engaged in specified manufacturing industries of Canada, 1920, at par valuation)

Nature of industry	Total value of securities	Owned in Canada	Owned in U.S.A.	Owned in U.K.	Owned in other countries
	\$	per cent	per cent	per cent	per cent
Lumber (forest production)...	441,008,000	72.3	14.5	13.1	0.1
Lumber (mill production)....	266,840,000	68.3	19.0	12.5	0.2
Pulp and paper.....	294,551,000	69.5	20.0	7.4	3.1
Central electric stations.....	¹ 292,448,000	79.8	14.6	4.2	0.2
Steel furnaces and rolling mills	117,124,000	57.7	40.8	0.9	0.6
Copper smelting (includes some lead, zinc and nickel)	111,922,000	13.4	51.7	34.0	0.9
Agricultural implements.....	86,393,000	50.0	38.8	10.0	1.2
Foundry and machine shop products.....	53,611,000	48.8	39.8	11.2	0.2
Electrical apparatus.....	52,666,000	43.4	45.1	9.6	1.9
Cotton textiles.....	² 51,425,000	85.6	9.5	0.8	0.1
Rubber.....	² 49,789,000	52.3	36.1	4.3	0.1
Shipbuilding.....	39,497,000	37.8	33.5	24.9	3.8
Liquors, malt and distilled...	34,532,000	89.4	2.0	8.4	0.2
Flour and cereal mills.....	34,407,000	90.8	3.9	4.4	0.9
Drugs and chemicals.....	33,171,000	32.9	52.0	14.3	0.8
Fish canning and curing.....	25,936,000	58.5	29.4	12.0	0.1
Patent or proprietary medicines.....	25,013,000	16.8	79.4	0.9	2.9
Woollen textiles.....	24,905,000	98.5	0.4	1.1	0.0
Automobiles and accessories..	24,498,000	30.7	69.2	0.1	0.0
Paint and varnish.....	23,966,000	48.3	50.1	1.6	0.0
Asbestos mining.....	23,308,000	63.9	29.9	6.2	0.0
Leather boots and shoes.....	22,122,000	99.3	0.4	0.2	0.1
Building and construction....	21,934,000	85.8	10.3	3.8	0.1
Hosiery and knit goods.....	19,956,000	90.3	6.0	3.5	0.2
Artificial abrasives.....	11,621,000	0.9	98.7	0.4	0.0
Biscuits and confectionery...	10,524,000	95.2	4.5	0.3	0.0
Leather tanning.....	9,906,000	99.1	0.9	0.0	0.0
Brass and copper.....	9,235,000	43.0	56.6	0.4	0.0
Total for specified industries.	2,212,308,000	64.8	24.4	9.6	0.8

¹\$3,580,000 securities undistributed.

²Distribution of \$2,062,500 bonds not known.

³\$3,600,000 bearer bonds not recorded as to ownership.

Table XLIX, based upon figures compiled by the Dominion Bureau of Statistics, furnishes a useful indication of the degree to which the securities of certain leading industries are held by investors within and beyond the Dominion. While the table does not cover the entire field, it includes a broad and representative range of the larger industries.

British investors, it will be observed, are strongly interested in a limited number of the specified industries, notably in smelting and ship-building, but in many others are represented only to a very small extent. In the manufacturing field United States capital greatly exceeds the British in volume, is more generally distributed and, in certain instances, forms the controlling interest. But very few of the larger industries founded upon the development of Canadian resources and the finishing of Canadian raw products are chiefly in the hands of investors abroad. Despite the heavy investments of British and American capital, the securities of industrial companies are held mainly by Canadian investors.

The broad groups of industries embrace a multiplicity of specialized branches of manufacture, to which the requirements of national growth are

constantly adding. The advance of settlement and agriculture creates an infinite variety of new needs—not merely of farming implements but of all that enters into the building of new communities. The growth of forest industries brings the need for the complicated mechanisms of paper mills and for the equipment of power plants. Thus, in furnishing the tools of basic development and finishing a wide range of natural products, Canada offers a field for manufacturing enterprise on a scale which even the rapid expansion of recent years has by no means fully attained.

CHAPTER X

Government and Education

WITH an ample estate in the material requirements of national well-being, Canada combines the stability of political institutions and the high standards of education without which the most generous domain of natural resources can foster but little enduring or progressive industrial life.

The Dominion of Canada is a partner nation of the British Empire. Organized as a confederation July 1, 1867, it now comprises nine provinces, with additional territories, and embraces the whole of the northern half of the mainland of North America, with the exception of Alaska and part of the Labrador coast. The total area is 3,729,665 square miles, and the land area 3,603,910 square miles. The population numbers 8,788,000, predominantly of British birth or descent but including also a large proportion of French extraction. All other races together constitute about one-fifth of the total population. The French language is in



DOMINION PARLIAMENT BUILDING OTTAWA

common use in the province of Quebec, where the majority of the inhabitants are descendants of the settlers of the French regime.

TABLE L.—AREA AND POPULATION

Province	Land	Water	Total	Population 1921
	sq. miles	sq. miles	sq. miles	
Nova Scotia.....	21,068	360	21,428	523,837
Prince Edward Island....	2,184	.....	2,184	88,615
New Brunswick.....	27,911	74	27,985	387,876
Quebec.....	690,865	15,969	706,834	2,361,199
Ontario.....	365,880	41,382	407,262	2,933,662
Manitoba.....	231,926	19,906	251,832	610,118
Saskatchewan.....	243,382	8,318	251,700	757,510
Alberta.....	252,925	2,360	255,285	588,454
British Columbia.....	353,416	2,439	355,855	524,582
The provinces.....	2,189,557	90,808	2,280,365	8,775,853
Northwest Territories....	1,207,926	34,298	1,242,224	7,988
Yukon.....	206,427	649	207,076	4,157
Canadian navy.....	.....	.....	.....	485
The Dominion.....	3,603,910	125,755	3,729,665	8,788,483

The political system is that of a federal union. The form of government and the division of jurisdiction, as between federal and provincial authority, are defined by the British North America Act of 1867. Both the Dominion and the provincial governments are administered in accordance with British parliamentary practice. Thus, though of relatively recent origin in respect to its federal system, Canada enjoys the full advantage of political institutions which represent the achievement of many centuries of constitutional development.

Education

Under the Canadian constitution the control of education is vested in the provincial governments. All of the provincial systems are based upon the principle of free education, the funds being supplied by government grants and local taxation.

From primary schools to universities the curricula are so co-ordinated as to secure a natural transition from the lower to the higher institutions. Technical education, which is comparatively new in state schools, has made very rapid advance during the past five years. The technical courses include agriculture, domestic science, mechanical and art courses, handicrafts, and vocational instruction. Each province possesses one or more universities or colleges for higher education, of which Toronto, McGill (Montreal) and the University of Montreal are the largest. Recent statistics show more than 35,000 students and 3,300 professors in the twenty-two Canadian universities.

A significant index to the liberal provision made for education in the Dominion is furnished by the fact that the expenditure of the nine provinces for such purposes in 1920-1921 exceeded \$102,000,000. Even more significant of the importance attached by the Canadian people to the maintenance of high educational standards is the fact that in the same year the total enrolment of

schools, colleges and universities numbered 2,029,000, or approximately 23 per cent of the total population of the Dominion.

There is no formula for judging the course of national development. The most cautious forecast may prove extravagant, and the most optimistic may fall far short of actual accomplishment. Sixty years ago President Lincoln pointed out, in his second annual message to Congress, that the population of the United States in 1920 would exceed 186,000,000 if the rate of increase continued to be as great as it had been between 1790 and 1860. The United States did record amazing progress but the population in 1920 failed, by some 80,000,000, to reach the number mentioned in Lincoln's message.

Again, achievement may just as strikingly outstrip anticipation. In 1898 the renowned scientist, Sir William Crookes, delivered a very impressive statement on "The Wheat Problem" as his presidential address before the British Association for the Advancement of Science. Reviewing the prospective sources from which the world might draw increased supplies of wheat, the speaker stated that "the most trustworthy estimates give Canada a wheat area of not more than

6,000,000 acres in the next twelve years, increasing to a maximum of 12,000,000 acres in twenty-five years." The passing of nearly twenty-five years has shown this estimate to be too conservative. Canada's wheat area reached the estimated maximum of 12,000,000 acres considerably in advance of expectation, and continued to increase. In 1921 an area of more than 23,000,000 acres was sown to wheat and Western Canada still possessed many additional millions of acres of uncultivated land.

But, though the rate and course of national growth baffle prophecy, there can be no doubt that Canada has yet realized but a small measure of her potential stature in industry and commerce. With liberal resources of the field, the forest, mine and waterfall and the sea; with extensive systems of rail and water transportation, commanding gateways for the commerce of the Atlantic and the Pacific, a geographical situation favourable to trade with the populous markets of Western Europe and the Orient, a friendly nation of more than one hundred millions alike in language and customs as neighbour to the south, with sound institutions of government, strong racial ties and with free but far-reaching political associations, the Dominion faces a career in which the period of economic youth and growth has still a long and promising course to run.

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A

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